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MEGAKARYOCYTE IN PERIPHERAL BLOOD

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Immature cells of the red and white cell series are not infrequently found in the peripheral blood in different pathological conditions. But megakaryocytes are only rarely found in the peripheral blood even in pathological conditions. Recently in the routine examination of a blood smear for differential count, a megakaryocyte was encountered and we are reporting the case on account of the rarity of the finding.

CASE REPORT

R, a female child aged 5, had been suffering from refractory anæmia associated with enlarged spleen for over 3 years. The child was reported to be slightly lethargic and did not take part in active games with other children of the same age group. The child looked rather pale but appeared to be well nourished. On examination the spleen was found to be enlarged, about 4 inches below the costal margin. The spleen was firm but not tender. The liver was enlarged, one inch below the costal margin. No other abnormality was detected. The blood picture and marrow picture as obtained by tibial puncture are given below. Photomicrographic appearances of peripheral blood and marrow smear are shown in Figs. 1 and 2 respectively.

BLOOD PICTURE

Hb. in gm. per 100 ml.	*R.B.C. per c.mm.*	*M.C.V. in cu. microns*	*M.C.H. in micro-micrograms*	*M.C.Hb.C. %*
6·96	3,110,000	86·8	22·3	25·7

DIFFERENTIAL COUNT (PER CENT OF TOTAL NUCLEATED CELLS)

Total Nucleated cells per c.mm.	*Neutrophils*			*Eosino-phil*	*Baso-phil*	*Lympho-cyte*	*Mono-cyte*	*Normo-blast C*
	Staff & Segmented	*Myelo-cyte*	*Meta-myelo-cyte*					
21, 500	43·5	6·0	1·0	3·0	0·25	29·0	3·25	14·0

One megakaryocyte and myeloblast were also seen in the peripheral blood.

Platelet count—143,250 per c.mm.
Vanden Bergh Test—Direct—Negative
Indirect—Positive. 0·3 mg. per 100 c.c.
Wassermann reaction of blood was negative.

MARROW PICTURE

Total nucleated cell count—205,000 per c.mm.
Differential count (per cent of Nucleated cells)

Red Cells			*White Cells*				
Megaloblast	*Normoblast*		*Granular*			*Non-granular*	
—	Early	—	Myeloblast		—	Lymphocyte ..	2·2
	Intermediate ..	1·0	Pre-myelocyte		0·2	Plasma cell ..	—
	Late	78·0				Monocyte ..	0·6
			Myelocyte	Neutro ..	6·0		
				Eosino ..	0·2		
			Metamyelocyte	Neutro ..	0·6		
				Eosino ..	—		
			Staff & Segmented	Neutro ..	10·6		
				Eosino ..	0·6		
				Baso ..	—		

DISCUSSION

A comprehensive account about the significance of the megakarocytes in the peripheral blood was given by Minot in 1922 and recently by Whitby (1948).

Minot found megakaryocyte in the peripheral circulation in 35 out of 45 cases of myeloid leukaemia and also in 2 cases of polycythaemia vera, one of Hodgkin's disease, one case of lobar pneumonia and one of sepsis. The case described by Whitby is one

of leuco-erythroblastic anæmia and many of the cases reported in recent years, an account of which is given in Whitby's paper, exhibited a leuco-erythroblastic anæmia. The incidence, however of the presence of megakaryocyte in the peripheral blood as found in the literature as also from our experience is very low. We have examined thousands of blood smears during the last 16 years for various pathological conditions of blood and this is the first time that a typical megakaryocyte has been found in the peripheral blood. During an informal discussion about this finding, Dr. P. C. Sen Gupta, Officer-in-charge, Kala-azar Research Department of the School showed the drawing of a cell which he had seen in the blood of a case of acute myeloid leukaemia some years ago;—the identity of which cell was not established at that time. As far as can be judged from the drawing the cell appears to be a megakaryocyte.

According to Minot, the presence of megakaryocyte in the peripheral blood was normally associated with an increase of platelets in the circulating blood except in some cases of myeloid leukaemia in which, despite the presence of megakaryocyte in the blood, the platelets might still be normal or even decreased. In the reported case which is undoubtedly one of leuco-erythroblastic anæmia the platelet count was definitely low and therefore our findings are not in full conformity with those of Minot. But nevertheless on the basis of clinical and hæmatological findings in this case we fully agree with Minot that the 'presence of these cells in the blood smear is not to be looked upon as indicative of a desirable type of marrow regeneration, but more as an indication of marrow disintegration recovery from which may, however, occur.'

ACKNOWLEDGMENT

The case was referred to us by Dr. M. Biswas, M.B., (CAL.), D.C.H. (LOND.), M.R.C.P. (LOND.), Visiting Physician, Chittaranjan Sishu Sadan, Calcutta, and our thanks are due to him.

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DISTRIBUTION OF BLOOD GROUPS

Amongst Calcutta Blood Bank Donors

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Discovery of the human blood groups by Landsteiner followed by further work and improvement on the subject by other scientific workers pointed out that the phenomenon of blood grouping is of paramount importance in the field of blood transfusion which played an important role particularly during the last war. This communication is a study on the distribution of four human blood groups worked out amongst the Calcutta Blood Bank donors population who donated blood during and after the last great war and is not associated with blood transfusion. The relationship of blood grouping and its significance was first worked out by Hirschfelds amongst soldiers of different nationalities during the great war of 1914-18. Since then various investigators worked on the subject of blood grouping throughout the world and recorded the comparative data amongst different races. It so happened that the last great war brought various races together from different parts of the globe in active war service and great many of them assembled in the vast sub-continent of India. The city of Calcutta being one of the very important centres for troop movement in several eastern theatres of war, the Calcutta Blood Bank at the All-India Institute of Hygiene and Public Health of the Government of India under the then Director J. B. Grant took the initiative and made a successful propaganda drive in securing and in enrolling in the donor's list thousands of personnel from various nationalities irrespective of sex, caste or creed. No biological significance is attached to this paper and is neither worked out from the anthropological point of view nor on inheritance problem and as such Mendel's law or Bernstein equation or Snyder's formulae do not come into the picture.

TECHNIQUE

Technique adopted for identification and classification of the blood groups is the same as employed by other past workers. Details are not given but a few of the points only are described here. Unknown washed red blood corpuscles and serum separated from the clotted sample of each donor after centrifugalisation is tested with known 2 per cent A & B cell suspension in normal saline and standard potent alpha and beta serum for identification of the group. Double checking is always done by two different workers before confirmation to avoid laboratory errors or any other discrepancy. While preparing the stock standard alpha and beta serum the following points are strictly observed:

(*a*) Haemolysis
(*b*) Sterility
(*c*) Titre
(*d*) Temperature.

Haemolysis or contamination or both combined often cause error in grouping and is scrupulously avoided. Titre and temperature is essential from potency point of view and accuracy of the test. The titre of the serum should be reasonably high and considered unsuitable for our use if below 1 in 50. Standard serum when prepared is bottled in 1 or 2 c.c. sterile ampoules which are sealed and kept in the refrigerator. They are used for routine work and periodically checked for any deterioration or contamination. The Calcutta Blood Bank supplied standard alpha and beta serum to various laboratories and clinics maintaining small scale transfusion service in several centres in India, and in many teaching institutions which is being continued.

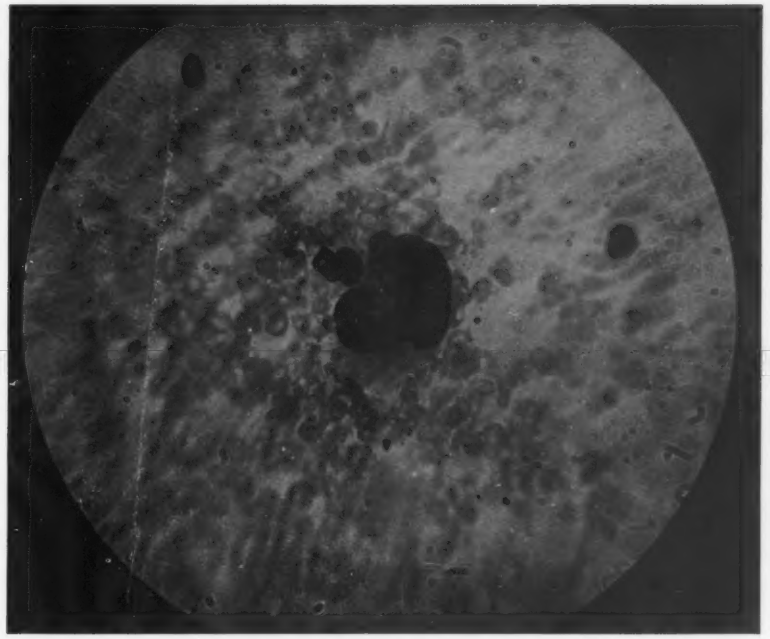

FIG. 1—Peripheral Blood Smear. Field shows a Megakaryocyte. (Magnification × 570)

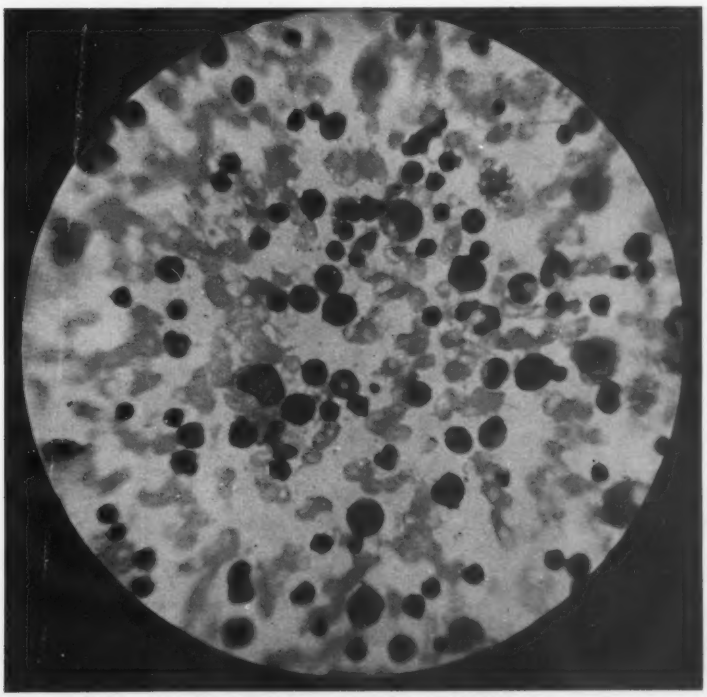

FIG. 2—Marrow smear. Marrow is cellular with great preponderance of Late Normoblasts. (Magnification × 485)

FIG. 1—Showing enlarged, bulbous kidney which was filled with fluid as in hydronephrosis.

FIG. 2—Showing carcinoma of the renal pelvis associated with pelvic stones, which on microscopical examination was found to be squamous-celled.

CHART SHOWING THE DETERMINATION OF HUMAN BLOOD GROUPS (INTERNATIONAL) USED FOR ROUTINE WORK

(1) Using known high titre sera for unknown cells.

Group B serum (alpha agglutinins)	*Group A serum (beta agglutinins)*	*Result* (International groups)
+	+	AB
+	−	A
−	+	B
−	−	O

(2) Using known type cells* for unknown sera.

Group A—cell	*Group B—cell*	*Result* (International groups)
−	−	AB
−	+	A
+	−	B
+	+	O

*Fresh cell suspension is made every day and used for routine test after checking.

Equipments for Collection of Blood.—The equipments necessary consist of bleeding instruments, international blood collecting bottles, 2 c.c. of 2 per cent sodium citrate solution in 0·85 per cent normal saline put in a 4″×½″ test tube and one small 10 c.c. capacity dry corked bottle or test tube. All these materials are autoclaved at 15 lbs. pressure for half an hour before use. From each individual donor blood sample is collected in citrated and dry tube. About 0·5 c.c. of blood is put into the citrated tube and about 4 to 5 c.c. in the dry tube which is left in the tube of the bleeding set at the end of the donation. The citrated tube is centrifuged and the red blood corpuscles are washed three or four times before testing for grouping and in the same way serum is separated from the clotted sample which is used for grouping and for cross-matching, if necessary. Grouping is done on usual slide method and very rarely in tube method. The naked eye macroscopic reading is always taken and sometimes observations are made with the help of a hand lens.

SOURCE OF MATERIAL

In one word the last great war was the source of our material. Blood donors were not only from the city of Calcutta but also from all parts of Bengal, parts of Bihar, Orissa and C.P. The majority were from different regiments raised during the last war. The outside collection was made by the touring teams of the Blood Bank who used to collect blood from donors from different out-station centres and despatch the same packed in ice in specially made boxes through the quickest transport route to the headquarter blood bank in Calcutta for necessary test.

TABLE I—SHOWING THE PERCENTAGE OF BLOOD GROUPS OF FEW OF THE DIFFERENT NATIONALS BY DIFFERENT WORKERS

Nationality	*Investigators*	*No. of persons tested*	*Percentage of groups* O	A	B	AB
AMERICANS:						
United States ..	Snyder	20,000	45·0	41·9	10·0	4·0
U.S. New York ..	Tilber	10,000	45·6	36·4	13·5	4·5
BRITISHERS:						
England	Penrose & Penrose	1,000	43·2	47·6	6·4	2·7
Liverpool	Jones & Glynn	1,600	46·0	30·0	17·0	7·0
Irish (Dublin) ..	Sachs	2,435	53·6	32·4	11·5	2·5
CHINESE:						
Human	Li-Chi-Pan	1,500	31·3	38·1	20·7	9·9
Peking	Liu-Wang	1,000	30·0	25·0	35·0	10·0
Canton	Dormanns	1,000	45·5	22·6	25·0	6·1
INDIANS:						
Rajput	Malone & Lahiri	188	28·8	28·0	33·0	10·2
Munda-Santal ..	do.	589	24·3	27·5	36·8	11·4
Toda	Pandit	200	29·5	19·5	38·0	13·0
Plainsman (Assam) ..	Mitra	2,000	33·7	24·6	32·5	9·2
Bengal	Macferlane	160	32·5	20·0	39·4	8·1
„	Greval & Chandra	201	37·81	19·9	35·32	6·97
„	do.	321	29·5	24·6	36·4	9·3
Oraons	Sarkar	155	47·10	12·90	34·84	5·16
Munda	do.	120	33·33	30·0	29·17	7·5
Santal	do.	339	33·04	20·94	34·81	11·21
Tamils (Coolies mixed)	Bais & Verhoef	384	23·0	37·9	31·6	7·5
ANGLO INDIANS:						
(*a*) I.M.D. Students ..	Greval & Chandra	67	40·29	41·79	14·92	2·98
(*b*) Others (European ancestry may be remoter) ..	do.	279	36·5	36·9	20·4	6·09

Amongst regimental donor population particular mention is made of those who are classified in our group list. They are Americans, Britishers, Chinese, Anglo-Indians, Punjabis (Sikhs), Madrassis, Gurkhas, Bengalees both Hindus and Muslims and the tea garden labourers (coolies). The labour class represents

people from different provinces in India and they are in a sense from the so-called depressed sections. The tea garden donors were from the tea-growing districts of Jalpaiguri and Darjeeling. The entire labour population were Hindus and recruited from Central Province, Chotanagpur and Santal Parganas, the special tribes known as Uraon, Mundas and Santals and also the Madrasis, Tamils and Telegus from the bordering districts of upper Madras Presidency. The entire labour section of people could not be classified owing to several factors but pooled together and shown as tea garden Hindu labourers.

TABLE II—SHOWING THE PERCENTAGE OF BLOOD GROUPS OF THE DIFFERENT NATIONALITIES WHO DONATED BLOOD IN THE CALCUTTA BLOOD BANK DURING AND AFTER THE LAST WAR

Nationality	*No. of persons tested*	*Percentage of groups*			
		O	A	B	AB
American ..	1094	45·6	41·9	9·3	3·2
Anglo-Indian ..	430	41·8	33·0	20·1	5·1
British ..	2854	44·2	43·0	8·8	4·0
Bengali Hindu ..	4232	35·4	24·5	33·5	6·6
Bengali Muslim ..	558	37·6	24·7	32·2	5·5
Chinese	5230	35·3	30·5	25·7	8·5
Gurkha	444	32·4	34·5	24·1	9·0
Madrassi ..	207	44·4	15·6	33·8	6·2
Sikh	210	23·3	34·7	28·6	13·4
Tea Garden labourer (Hindu) ..	2123	30·5	26·7	32·0	10·8
Total ..	17,382				

As regards the American donors only the white Americans are recorded in the group list as there was negligible number of coloured Americans who are not included in the table. The American donors are not classified according to their homeland but mentioned as Americans from the U.S.A. The Britishers are also recorded in the same way. About 80 per cent of the total British donors were from different pure British Regiments and the rest 20 per cent from the civilian population. The same applies to the Chinese donors. The entire Chinese regiment raised during the last war from all shades and grades hailing from different parts of vast China of which a few thousands were stationed at Ramgarh training camp a place midway between Ranchi and Hazaribagh in the province of Bihar. The army personnel of this Mongolian race consisted of Christians, Budhists and Muslims but from their manners, customs and features no differentiation could be made and hence classed as one. The rest of the donor population is classified according to the racial and provincial distribution representing different provinces in India.

DISCUSSIONS

A comparative study is made between Tables I and II and it will be observed that the group distribution amongst donors of different races worked out by different workers are very much identical with some amount of difference. The difference, however is more conspicuous in the case of Indian races of different provinces.

Regarding the Americans, the investigation of Snyder and Tilber and the group distribution as shown in Table I amongst the United States people corroborates with our finding which is in Table II.

The figures given by the British investigators of whom three only have been inserted in Table I, will show that the group 'B' distribution, worked out jointly by Jones and Glynn besides others, is a little higher than our findings. The reason for this rise in B group distribution is difficult to ascertain as our figures are in uniformity with other foreign workers amongst the British people. It may, however be mentioned here that our figures, particularly regarding the Britishers, were not limited to any particular country of British Isles but the donor population were from various British regiments representing the whole of United Kingdom and the results were pooled together.

Regarding the Chinese donors our figures are very much identical and corroborate with the figures of different Chinese workers which are shown in Table I.

Besides others, a few words about the Anglo-Indian donor population may be interesting. So far as the Anglo-Indians are concerned, it will be better to ascertain what is actually meant by the term Anglo-Indian. If they are considered to be domiciled Europeans and have maintained the purity of the race then they can be classed as Europeans and the group distribution percentage can be compared with that of the pure Britishers and there should be no difference but if the Anglo-Indians are supposed to be a probable combination of East and West by intercaste marriages, as very often is the case, the significance of group distribution is important.

Literature says that previous to our work only Greval and Chandra had done the Blood Grouping amongst some of the Anglo-Indians and had shown the I.M.D. students as Anglo-Indians. If that be the case we differ with the finding, particularly with the B group distribution. But Greval and Chandra have shown another figure the nomenclature being 'others (European ancestry may be remoter)" and there, they have shown the percentage of B group distribution as higher than A group and these figures are identical with our figures. Evidently it shows the difference between European and Anglo-Indian and the significance is mainly due to larger proportion of B group amongst the Anglo-Indians and comparatively smaller proportion of group A. The distinct rise of B group amongst the Anglo-Indians are suggestive of a mixed race which need further investigation amongst larger number of Anglo-Indian population of different colonies in India.

The Bengalee Hindus represent practically the whole of Bengal and we have not classified them accord-

ing to the castes as it was not possible due to several factors as has been done by the previous workers. Our figures of the Bengalee Hindus represent practically literate class only. Work done by previous investigators, if collected together will show that the group distribution amongst the various castes of Hindu population does not differ markedly from our findings. The Bengalee Muslims were from the East Bengal districts of Barisal, Chittagong, Noakhali, Khulna, Dacca and Sylhet. They were enrolled in the army and were employed during the war period to guard the waterpaths. This class of Muslims were mainly from the poor labour class population. The Gurkhas, Sikhs and Madrassis were all from different regiments and represent their respective provinces. The Sikh population showed low percentage of group 'O' and proportionately high percentage of group 'AB' which is unlike Indians of other provinces. Our figures are not high enough to draw any conclusion. The Madrassis who were a mixed regiment of Tamils, Telegus and other South Indian castes show a definite low incidence of group 'A' when compared with other Indian donors of other provinces. This considerable low percentage of group 'A' is probably a peculiar racial phenomenon which need further investigation.

The last in our list are the Hindu Tea garden labourers. This labour population were all Hindus and recruited from Chhoto-Nagpur, Santal Parganas, Bilaspur and from the bordering districts of upper Madras Presidency. We have shown their group distribution together. In Table I it will be seen that Sarkar has worked amongst the different aboriginal races and has classified them according to their tribe and caste distribution. Though we have not classified them according to their castes, yet Sarkar's figures corroborate our findings of the tea garden labour population. This labour population consisted mainly of aboriginal tribes and belonged to the depressed class. They were Oraons, Mundas, Santals and Tamils and Telegus as far as the information could be collected.

Summary

The distribution of blood groups of 17,382 donors of different races who donated blood in the Calcutta Blood Bank during the last war has been studied employing a modified technique which has also been briefly described. A comparative study has been made with findings recorded in published literature. The outstanding findings are that the Bengalees both Hindus and Muslims, and other Indians reveal blood group features which are distinct from the Mongoloids. Some interesting observations about the nature of blood groups of Anglo-Indians also emerge from this study.

Acknowledgment

The authors are indebted to Dr. K. V. Krishnan, Professor of Microbiology, All-India Institute of Hygiene and Public Health for all the laboratory help rendered by him in various ways when the Blood Bank was under the Central Government.

STUDY ON THE BERGER KAHN TEST FOR SYPHILIS

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Berger in 1943 found that certain dyes like Victoria blue or Janus green when mixed with suitable alcoholic heart extract, caused in syphilitic sera not only the formation of coloured precipitates but an increase in sensitivity of the reaction. This sensitivity was directly proportional to the amount of dye present in the antigen. Berger interpreted the sensitizing action of dye as an antibody-like effect which had been deprived of its specificity. In the newly discovered serum test for syphilis with the help of a dye, Berger preferred Victoria blue to Janus green because very fine dispersion of alcoholic antigen could be obtained with it.

Fodden and Maddox (1947) in Donaldson Hudson pathological laboratory Shrewsbury, carried out 970 serological tests for syphilis (Berger Kahn Test). They obtained uniformly good and correct results. They wished to emphasize that every one of their positive W. R. results gave a positive reaction with Berger Kahn Test. They also found it quite easy to grade positive on the size of the particles given by the Berger Kahn Test.

Considering the simplicity and accuracy of the test routine Berger Kahn Test has been started in the Eye Infirmary of the Medical College Hospitals and up to the writing of this paper about 1200 sera have been examined for Berger Kahn and Standard Kahn Test. W.R. was also done in the first 605 cases.

The preparation of antigen and the technique of the test with slight modification as recommended by Berger, were carried out in the following manner.

Preparation of Stock Antigen

To 4 c.c. of standard Kahn antigen having a titre of 1:1·2 (Difco, P.D., B.D.H., I am using B.D.H.), add 0·4 c.c. of tincture benzoin co. (Rect. B.P.) and 7·2 mgs of Victoria blue (Grubler). Shake well. The stock antigen should be kept well stoppered in room temperature. The stock antigen keeps well for at least 6 months.

Method of Test

Preparation of antigen—1 c.c. of normal saline is pipetted into the bottom of a dry test tube by means of a 1 c.c. pipette and 0·1 c.c. of the stock antigen measured by means of Kahn pipette is added into the tube. Shake well. This dispersed antigen is ready for immediate use and can be used during any time on the day of preparation. The prepared antigen is sufficient for 35 tests. When lesser amount of antigen is required 0·5 c.c. of saline can be mixed with 0·05 c.c. of stock antigen. The prepared antigen should always be shaken well before use.

Preparation of sera—Care should be taken that the sera are absolutely free from R.B.C. Badly hæmolysed sera are to be discarded as they may sometimes

give false positive reactions. Decomplementation of the sera at 56°C. for ½ hour should be done. Once examined sera should be decomplemented at 56°C. for 10 minutes before being tested for the second time.

Now place on a glass slide one drop of the serum to be tested and add a drop of equal size of the prepared antigen. Mix the drops with a pointed glass rod and then rock the slide with hand for 3 minutes and read the result at once.

For dealing with a large number of sera, I use a ½" thick transparent glass plate 8"×8" with 12 circular, concave shallow grooves or depressions cut into it. The depressions are 1" in diameter. The mixed drops do not splash out during rocking. 12 tests are done at a time. Other suitable arrangement or contrivance can be done according to the desired and convenience of the pathologist. The plate or slide as the case may be is held over a sheet of white paper. The result can be read macroscopically very easily as the floccules are coloured blue. Strongly positive sera show large deep blue floccules in a water clear supernatant fluid. Moderately positive reactions show moderately large blue floccules in a faint blue fluid. Weakly positive reactions show small and sometimes very small blue floccules but easily visible in naked eye, in a bluish fluid. Negatives show no flocculation whatever, the mixed drops remaining quite homogeneous and of a sky blue colour.

I have found that the result obtained with Berger Kahn test tally almost completely with W.R. and Standard Kahn Test.

Comments and Remarks

Compared with W.R., Berger Kahn test is easier, simpler, more sensitive and more specific. Compared with standard Kahn test it is easier and more sensitive. Very weakly positive sera as are frequently met with in old treated cases are often missed by the standard Kahn test. Such cases are easily detected by the Berger Kahn test because of the pronounced staining of the floccules which occurs.

In the routine serological test for syphilis, I have found Berger Kahn test vastly superior to the popular W.R. and standard Kahn test. Very small quantity of blood is required for the test. Another outstanding feature of the test is that the cost of carryiug out the tests is nominal. In fact 3000 serological tests would cost rupees twenty only. On account of accuracy, simplicity and cheapness of the test it can be carried out successfully in small departmental pathological laboratories of big hospitals, in muffusil laboratories and even in a physician's chamber.

Acknowledgment

My thanks are due to Mr. T. Ahmed M.B. (CAL.), F.R.C.S. (EDIN.), D.O.M.S. (LOND.), late Professor of Ophthalmology, Medical College who introduced this test in the Eye Infirmary and made all facilities available to me for carrying out the test.

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THE AETIOLOGY OF IDIOPATHIC HYDROCELE

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Introduction

Idiopathic or primary hydrocele of the tunica vaginalis testes is a common condition in this country. The word 'idopathic is a challenge to the thinking mind: It is derived from idio = one's own, patho = disease. It thus literally means a self existing disease or a disease without a cause. By common usage the term gives us a false sense of satisfaction and makes us forget that the cause of 'idiopathic hydrocele' is still unknown. The word is however best given up altogether, as there is in most cases a definite aetiology. An attempt has been made in this paper to elucidate the different factors pertaining to the aetiology of this condition. In the meanwhile, I propose to call these cases "Common Chronic Hydroceles." The prefix "common" differentiates them from the comparatively uncommon chronic secondary hydroceles.

On reviewing the literature one finds very little written on this subject in last fifteen years in any of the leading journals of surgery. Campbell (1927) gives a review of 502 operated cases of hydroceles. It is in this article that the author has taken some pains to probe into the so-far unsolved problem of the aetiology of hydrocele. I have freely used his article to compare my findings.

Material for Study

This paper is a preliminary report on a study of 100 cases of chronic hydroceles. The study was begun three years ago in the Out-patients Department of the K.E.M. Hospital, Bombay. Investigations are still going on. I have approached the problem of aetiology of these hydroceles by the following means:—

1. Careful history taking.
2. Thorough examination of the contents of the tunica vaginalis testes after tapping.
3. Microscopic, cultural and biochemical examinations of the fluid, including cholesterol, albumin and total protein estimations.
4. Biopsies of the hydrocele sac.
5. Search for clinical evidence of any concomitant disease like syphilis, tuberculosis, gonorrhoea, filariasis, vitamin and other dietetic deficiencies.
6. Blood examinations for Kahn test and microfilaria test in suspected cases.
7. Microscopic examination of prostatic smears in suspected cases.

History

The disease is as old as man himself. In the Hippocratic writings of about 460 B.C., an attempt was made to explain its aetiology on the basis of the Hippocratic humoral theory. The hydrocele was thought to be an effort on the part of the liver, kidneys and other viscera to get rid of underlying diseases

by throwing out into the scrotum certain obnoxious humors. Their accumulation was encouraged and was treated by internal medicines.

About 35 A.D., Celsus described translucency as an important sign in the diagnosis of the hydrocele! In India Sushrut classified scrotal swellings into seven distinct types. He also discusses at length their differential diagnosis and treatment.

वृद्धयः सप्तगदिता वातात्पित्तात्कफे न च।
रक्तेन मेदसा मूत्रादन्त्र वृद्धिश्च सप्तमः॥

"There are seven types of swelling (of the scrotum): those arising from disturbances of वात, पित्त and कफ; those due to (collection of) blood, fat and urine; and the seventh type is due to intestines."

The hydrocele was also recognised in his time and its treatment with fomentations and incision was also described! When one reads these masterly descriptions of our forefathers, one feels how meagre the progress has been in the last 2000 years.

Aetiology

Incidence—Campbell (*loc cit.*) states that hydrocele is the commonest swelling of the male reproductive tract. The incidence worked out by him was 0·24 per cent of total male admissions in a general hospital. The incidence in the tropics is far greater. Out of 15,446 male patients who attended the Surgical Out-patients' Department of the K.E.M. Hospital, Bombay, in one particular year, 1155 were cases of hydrocele. The incidence works out at 7·5 per cent. The patients with non-venereal diseases of the male reproductive tract numbered 2,227. Out of these 51·8 per cent attended for hydroceles. The incidence in the coastal towns of Kathiawar is still higher and is being worked out.

Age—The age incidence in my series is in accord with the figures given by Campbell.

He had 90 per cent of his cases over the age of 21 years, and the greater number were in the third decade. The second and third decades make up 73 per cent of my cases. Thus the incidence is highest during the years of maximum sexual activity. Only 16 per cent of my cases were above the age of 45 years. Amongst these, only 2 cases showed moderate enlargement of the prostate on rectal examination. Thus I cannot support the views of Winsbury-White and others (1932) who think that there is some relationship between an enlarged prostate and the hydrocele.

The youngest patient in this series was 2 years of age and the oldest 70 years of age.

Caste—It is a common observation in Bombay that hydrocele is very common amongst Bhayyas. In this series also 50 per cent of the cases were among Bhayyas. In order to trace the factors involved in this predominantly high incidence amongst this particular community, it was necessary investigate their mode of living in details.

Bhayyas are strongly built, vegetarian Hindus, hailing from the United Provinces. Their diet, though poor in quality, is fairly well balanced. An average Bhayya does a good amount of manual labour but their occupations vary to a large extent. Their favourite pastime is wrestling. They wear dhotis in a peculiar fashion about which I shall discuss later on.

In this series there were—
75 Hindus, out of which 50 were Bhayyas;
17 Muslims, out of which 4 were Pathans;
7 Christians; and
1 Jew.

Climate—The climate of a place has little direct effect on the incidence of hydrocele. But indirectly it may play an important part. Certain diseases, especially those of parasitic origin, are more prevalent in particular climates. Filariasis is an example. This disease is also one of the predisposing factors in the aetiology of hydroceles. Workers in filarial districts are so much led away by this coincidence that some of them believe that all so-called primary hydroceles are filarial in origin.

The patients in this series belonged to different districts having different climates except the Bhayyas, the majority of whom were from the United Provinces.

Diet and Nutrition—Out of the 100 cases in this series, 62 were vegetarians and 38 were taking mixed diets. The majority of the vegetarians were Bhayyas. Their diet always included some quantity of milk and occasional helpings of leafy vegetables. Cases taking mixed diets would add mutton, fish and eggs to their usual vegetarian diet, according to their means.

The nutrition of these patients was assessed from their physical development. They were found to be divided roughly into three groups: Group I consisted of healthy individuals with well-built muscular bodies. Group II consisted of flabby individuals with a moderate degree of anæmia. In group III were included individuals with pronounced anæmia. 64 patients of this series belonged to Group I and were healthy adults with well proportioned bodies, presumably nourished on a well balanced diet. 17 patients belong to Group II and 19 to Group III.

Only 3 cases out of the last group showed clinical evidence of deficiency of the principal vitamins and one had bleeding and spongy gums.

It is my opinion that dietetic deficiency does not play any part in the causation of hydroceles. If the deficiency of any dietetic factor is held responsible for this effusion in one serous cavity, why should the other serous cavities in the same individual escape?

Occupation—Hydrocele is not an occupational disease. In this series, only 3 cases were found where occupational trauma could be attributed to the development of the disease. One was a professional wrestler of 35 years standing, the second had to cycle long distances and the third was an engine driver who had to jump down the engine now and again. This point is further discussed under the next heading.

Trauma—The question of trauma is of primary importance in the causation of chronic hydrocele. I personally believe that the common chronic hydrocele never occurs without some type of trauma. The trauma may be direct on the scrotum crushing the testis, or it may be indirect like a fall causing flapping

of the scrotum against the thighs. The trauma may be severe, moderate or mild in nature. It is the mild traumata acting for a prolonged period, that play an important role in the aetiology of hydroceles. This type of trauma may act without the knowledge of the patient *e.g.*, the wearing of a very tight *Langot* by some persons.

In this series, there were 30 patients who gave a definite history of injury to their scrotums. In 56 other cases the dress worn by them, in my opinion, caused the mild type of trauma just discussed.

Dress—This brings us to the problem of dress. There are three types of dresses in our country which I believe help the development of hydrocele. First is a Dhoti worn "Kachha" fashion. Second is the tight *Langot* worn under a Dhoti or trousers. And the third is the heavy and loose Pathani trousers. The typical example of the first kind is met with in Bhayyas. They wear the Dhoti very tightly in between the thighs.

It is recorded by Madden that the high incidence of hydrocele in the Arabs is due to trauma caused by continuous flapping of their loose heavy trousers against the scrotum on walking. In this series 78 patients wore one of the above three types of dresses. In the remaining 22 patients who wore the inocuous type of dress, 8 gave definite history of trauma to their scrotums. Only 14 remained in whom the traumatic aetiological factor was not evident. With mild trauma, if there also exists a chronic infection of the genital system, the onset of hydrocele will not be long delayed. Indeed to my mind, in the presence of these two factors, the issue is inevitable.

Infection—It is stated that no case of hydrocele shows a normal testis and epididymis when visualised on the operation table. During the course of the present investigations, every scrotum was carefully palpated after tapping, and the condition of the cord, vas, epididymis and testis were noted. Palpable abnormalities of these structures were present in 62 per cent of cases. These were enlargement, nodularity, undue tenderness or change in consistency of the structures.

The second important evidence of the presence of chronic infection was found from microscopic examination of biopsies from the sac.

Thirdly in 60 cases, the clinical history was suggestive of specific or non-specific infection of the genital system prior to the development of the hydrocele. In 41 of these cases there was a history of gonorrhoea years before the onset of hydroceles. Gonorrhoea devitalises the genital system thus facilitating the non-specific organisms to take root. If all the above-mentioned methods of investigations are considered, there shall remain very few cases which fail to show some evidence of chronic infection of the genital tract.

Pathology

I. The Fluid—

(a) *Quantity*—The largest quantity of fluid yet recorded is 5 gallons (Caforio). In this series highest figure is 64 ozs.

(b) *Colour*—The usual colour of the fluid in this variety of hydrocele is some shade of yellow, generally described as straw coloured. Shimmering was seen in 31 cases. The fluid was chylous in 2 cases and one out of the two showed microfilaria under the microscope. A hydrocele of filarial origin need not always be chylous in character. In one case the fluid was colourless and yet contained many living spermatozoa.

(c) *Reaction*—The reaction of the fluid was mildly alkaline in all the cases as tested with the litmus paper.

(d) *Specific gravity*—The average specific gravity by the ordinary hydrometer was 1015, the highest reading being 1022 and the lowest 1006. By the drop method, the figures were higher, the highest being 1026 and the lowest 1015.

(e) *Albumin content*—The albumin content of the fluid was estimated by modified Esbach's method. The highest reading was 4½ per cent, the average being 3½ per cent. Western authorities give the albumin content of hydrocele fluid as between 4 per cent and 6 per cent.

(f) *Total proteins*—Besides albumin, the hydrocele fluid contains two other proteins, *viz.*, fibrinogen and paraglobulin. The total proteins were estimated by the falling-drop method. The highest figure for total proteins obtained by this method was 6·3 per cent and the lowest was 4·5 per cent. On subtracting the figure of albumin content from the total proteins, the figure for fibrinogen is obtained. Thus the maximum fibrinogen content was 2·3 per cent. Paraglobulin is present in very small quantities.

The figures for plasma proteins from the blood of hydrocele patients were within the normal range.

(g) *Cholesterol content*—Only 42 specimens of fluid showed typical cholesterol crystals under the microscope. Out of these, 31 had the characteristic shimmer on naked eye examination.

Quantitative estimation of cholesterol in the hydrocele fluid was done in 15 patients in this series. The method used was that of Leipoff. The highest figure obtained was 450 mg. per 100 c.c. of the fluid. The lowest was 108 mg. per 100 c.c. of the fluid. The cholesterol content did not show any relationship with the duration of the hydrocele.

(h) *Microscopic examination of the fluid*—The fluid from every hydrocele of this series was examined microscopically. It was collected aseptically and after centrifuging, it was examined within three hours of collection.

(i) *Usual findings*—Usually the fluid showed about 5 to 10 degenerated small lymphocytes and one or two macrophages per field. Sometimes a few endothelial cells were also found. No organisms were seen in fresh specimens. Cases which showed more than 30 lymphocytes per field gave severe reactions on injection of sclerosing solutions. This examination is therefore a good guide in selecting cases for injection treatment.

(j) *Abnormal findings—*

(*i*) Spermatozoa—In this series there were 6 cases which were clinically typical cases of hydrocele but which on microscopic examination of the fluid revealed a large number of spermatozoa. In four cases these were active and well formed. In one there were immature forms and in another there were plenty of dead spermatozoa.

(*ii*) Microfilaria—Contrary to common belief, the fluids containing microfilaria were not always chylous in character.

In this series, fluids from four patients showed the presence of microfilaria but only one of these had chylous fluid. History of attacks of swelling of the scrotum accompanied with fever and rigors was obtained from eight other patients. Two more patients had thickened scrotal skin which is so typical of filarial infection. Thus out of the 100 cases of this series, 14 had filariasis as one of the aetiological factors.

2. Blood for Microfilaria—Blood for microfilaria was examined in all the above fourteen patients as well as three other suspicious cases. Microfilaria were found in the peripheral blood of only six patients out of these seventeen. And three out of these six positive cases were the same in whom the fluid also showed presence of the microfilaria.

3. Blood for Kahn Test—The Kahn test was done in 55 cases. Only six were positive. In the remaining four it was weakly so. These figures confirm my belief that syphilis is hardly ever a causative factor in the aetiology of the common chronic hydrocele.

4. Prostatic Smears—These were taken in 12 cases. Of these eight had histories strongly suggestive of chronic gonorrhoea. None of these smear examinations revealed gonococci although a large number of secondary organisms like staphylococci and streptococci were present in all of them. The conclusion is that although the original gonorrhoeal infection dies down, it leaves behind a soil on which secondary invaders thrive. The prostate, seminal vesicles, epididymis and testes including the tunica vaginalis and its coverings become the seat of a mild non-specific infection.

5. Cultures—Cultures were taken from 15 hydrocele fluids on ordinary agar slopes and were examined 24, 48 and 72 hours after incubation at 37°C. Only two showed colonies of staphylococcus albus and aureus. This was considered to be due to contamination.

6. Biopsies of the Tunica Vaginalis Testes—In fifteen cases biopsies were taken from the tunica vaginalis under local anaesthesia. In thirteen cases the subserous layer showed foci of chronic inflammatory cells under the microscope. These foci were typically seen around the blood vessels. They mainly consisted of small lymphocytes, but plasma cells and large mononuclears were also present in small numbers. In three sections the number of capillaries had increased, and they were packed with R.B.C.'s., suggesting hyperaemia. The two cases in which the chronic inflammatory changes were absent had thick walls with immense fibrosis. The vessels in these sections were few in number and had also thickened walls.

Conclusions

From these investigations the pathogenesis of the common chronic hydrocele appears to be as follows:—

To begin with there is a specific (*e.g.* gonorrhoeal) or non-specific (*e.g.* filarial) infection of the genital tract which leaves behind devitalised tissues for the secondary organisms to settle down. These organisms are usually discharged from time to time into the blood of the patient from some chronic septic focus in his body. The presence of this secondary infection alone, may not give rise to a hydrocele until an oft-repeated or mild but prolonged trauma comes into action. Such a trauma will lead to further devitalisation of the tissues and may actually bring about the secondary infection if not already present. These secondary organism lodge in the tortuous glands of the prostate. From here they infect the seminal vesicles, vas, epididymis, tunica vaginalis and the tissues surrounding these structures. This chronic secondary infection increases the permeability of the capillaries. This causes the effusion. The natural processes of repair now come into force. Fibrosis occurs in the subserous tissues particularly around the capillaries obliterating many of them.

Summary

1. The so-called "Idiopathic Hydroceles" have in most cases a definite aetiology. A plea for abandonment of the unscientific word "Idiopathic" is made. These hydroceles may be named 'the common chronic hydroceles'.

2. The disease is common in this country. Every year about one thousand cases attend the surgical out-patients' department of a single hospital in Bombay.

3. It is very common among the Bhayyas. No occupational trauma is responsible but their mode of wearing the dhoti which causes a mild trauma is suggested as the cause of this high incidence.

4. Dietetic deficiencies have nothing to do with the aetiology of these hydroceles. The majority of the patients (64 per cent) were well developed healthy adults.

5. Next to trauma, mild chronic non-specific infection is the important aetiological factor. Specific infections like gonorrhœa, syphilis, tuberculosis and filariasis are not the direct causes but they indirectly predispose the genital system to non-specific secondary infection.

6. Microscopic examination of the fluid is important. It gives an idea about the degree of inflammation. Large number of spermatozoa or microfilaria may be present in the fluid even when it is straw coloured and translucent.

7. Prostatic smears of these cases suggest that the glands of the prostate are the sites where the non-specific infection lodges, flourishes and from where it later spreads to the rest of the genital tract.

8. Biopsy of the tunica vaginalis is introduced as an important and instructive method of studying the aetiology. Almost all cases showed foci of chronic inflammatory cells in the subserous and subcutaneous tissue especially around arterioles and capillaries.

9. The suggested histopathogenesis of these hydroceles is an increase in the permeability of the capillaries due to a low grade, chronic, non-specific infection of the genital system which is devitalised by previous trauma or infections.*

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SOME RECENT OBSERVATIONS MADE DURING THE TREATMENT OF TUMOURS OF THE NOSE AND NASOPHARYNX

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Tumours of the nose and nasopharynx are commonly classified into the following main groups:—

I. *Benign tumours*—These are rare in the nose, nasopharynx and air sinuses. They are subdivided according to the nature, vascularity, and consistency of the tumour as follows:

(1) Papilloma (hard, soft). (2) Osteoma. (3) Chondroma. (4) Osteo-chondroma. (5) Haemangioma. (6) Fibroma. (7) Glioma. (8) Mixed Tumour.

Other rare tumours are lymphangioma, adenoma, lipoma, etc.

II. *Malignant tumours*—These are more common in nose and nasopharynx than the benign ones, in the ratio of 2:1. They are also subdivided according to the nature, consistency and vascularity of the tumour as follows:—

(1) Nasopharyngeal fibroma. (2) Small round cell sarcoma. (3) Large round cell sarcoma. (4) Spindle cell sarcoma. (5) Giant cell sarcoma. (6) Squamous cell (epidermoid) carcinoma. (7) Basal cell carcinoma.

III. *Chronic granuloma of nose and nasal accessory sinuses*—These are tumours or tumour-like nodules of granulation tissue, and the cause of these depends on the underlying infection. They may be due to (1) syphilis, (2) tuberculosis, (3) lupus, (4) actinomycosis, (5) leprosy, (6) trauma and (7) pyogenic infection etc.

It is noteworthy that some tumours which appear to be benign in the early stages later on develop malignant changes, as is commonly seen in some chondromata which become chondrosarcoma, fibromata which change to fibrosarcoma, etc. Rhinosporidia which are characterised by profuse bleeding, even on slight pressure, and which offer considerable difficulty during removal on account of bleeding can be classified as locally malignant tumours.

Usually the patients come with complaints of obstruction in nose, inability to breathe freely through the nose, persistent headache on that side, etc. This headache is due to interference with the drainage of the air sinuses by the tumour pressing upon and closing the openings of the sinuses. The patients may also complain of recurrent attacks of bleeding from the nose, as in the case of sarcoma, angioma, rhinosporidium etc.

Relief in these cases depends upon the treatment of the underlying cause. The treatment of the benign tumours is removal by snare and then cauterising the base of the growth by galvano-cautery to prevent recurrence.

Coming to the treatment of malignant growths, the majority of them can be removed by snares, some with scissors. The profuse haemorrhage, both during and after the operation can be controlled by the usual haemostatic measures like calcium gluconate 10 per cent 10 c.c. I.V., Coagulen (Ciba) 5 to 10 c.c. I.M., haemostatic serum 2 c.c. I.M., sometimes by pituitrin 1 c.c. subcutaneously. In addition to these measures, ice packing over the nose and neck can be applied immediately with advantage. In spite of complete removals, there may be recurrences. These can usually be dealt with, by removal followed by galvano-cautery after subjecting the patient to local or general anaesthesia, as necessary. The best treatment in these cases would be to carry out under general anaesthesia with chlorform, diathermy cauterisation of those areas from which the tumour arose. Ether is highly inflamable and should in these cases be avoided.

Some of the tumours not only occupy the nose and nasopharnx but extend into the maxillary antrum on the affected side and give a dense opacity in the X-ray film. The correct treatment of these cases would be to deal with the tumour in the nose first, then that of the nasopharynx, and last of all approach the maxillary antrum. When routine investigations are done in these cases, nearly all of them give a negative Wassermann and Kahn test. A certain percentage of these tumours exhibit ulceration over the surface and produce a cauliflower-like growth.

CASE REPORTS

Case 1—Patient X, a boy aged 14 years came to the out-patient department of the Erskine Hospital, Madura on 8-10-48 for difficulty in breathing through the right nostril. Duration of the growth six months. The history was that it began as a small nodule in the right nostril and gradually increased in size. Local examination revealed a globular mass, reddish white in colour, of a fairly hard consistency, and with only slight mobility. The tumour bled easily on handling.

The usual investigations were carried out, and are given below:

R.B.C.—2·5 million per c.mm.; W.B.C.—5800 per c.mm.;

Differential count—polylmorphs 68 per cent, lymphocytes 24 per cent, monocytes 2 per cent, and eosinophils 6 per cent.

Kahn test negative.

Urine showed no sugar or albumen.

Radiological examination revealed complete opacity in the right nostril and the right maxillary antrum.

As the general condition of the patient was poor, he was given twelve injections of liver extract (2 c.c. I.M.) and eight injections of calcium gluconate (10 per cent 10 c.c. I.V.), mist. ferri et ammonium citrate 1 oz., three times a day was given per month and pulvis calcium lactate 10 grains three times a day. After a month of careful preparation an attempt was made on two occasions to remove the tumour under local anæsthesia. At both sittings there was profuse bleeding and the snare failed to cut through the tumour. In spite of ample local anaesthesia (cotton wool well soaked in 2 per cent percain and adrenaline solution packed into the nostril) the patient could not bear the pain and nearly fainted. A third attempt was made under general anæsthesia (chloroform and ether, 2:3 mixture), and a small mass was removed for biopsy. The piece removed was fibrous in structure and consistency. Bleeding was again a prominent feature but could be controlled by the usual haemostatic measures.

After a fortnight, about half of the growth was cauterised by galvanocautery, under general anaesthesia (using pure choloroform only). The patient was left alone for a fortnight and then the remaining growth was also cauterised. After some time however about 25 per cent of the original tumour was found to remain in the nose (might have grown again?). The patient was, therefore, subjected to deep X-ray treatment for about two months during which period he received twenty-four exposures. The patient felt much better and was able to breathe through the right nostril and was discharged with a request to come back and report periodically. He came back after three months with about half of the right nostril filled up with a growth and complained of difficulty in breathing. Biopsy report of the bit previously removed from the tumour had revealed "chondrosarcoma", though the naked eye appearance was of a fibrosarcoma. The patient again received twenty-four deep X-ray exposures, but the tumour continues to grow and removal by the extranasal route is being contemplated.

Case 2—Patient Y, a Hindu female aged 30 years was admitted on 12-12-47 with swelling of the right cheek, and a tumour completely filling the right nostril, pushing the septum towards the left. The patient complained of inability to breathe through the right nostril, and occasional attacks of bleeding from the right nostril, headache on the right side. The tumour appeared as if it was wedged tightly in the right nostril, reddish white in colour, practically immobile even when it was manipulated. It was hard in feel and bled easily. Routine investigations revealed the following:

Blood for Kahn—negative; R.B.C.—3·5 million per c.mm., W.B.C.—7800 per c.mm.; Differential count—polymorphs 65%, lymphocytes 26%, monocyte 1% and eosinophils 8%; H.B.%—65. Urine showed no sugar and albumin.

Radiological examination showed an opacity in the right nostril and the right maxillary antrum. Boundaries of the maxillary antrum were hazy, suggestive of a malignant tumour in the right nostril and antrum. There was erosion of the bony walls of the antrum. In this case there was not enough space to carry out even a diagnostic puncture of the right maxillary antrum. The growth was completely filling the whole of the right nostril. As in the previous case, attempts to remove under local anaesthesia on two occasions proved futile due to profuse bleeding, and the patient was unable to bear the pain. A third attempt under general anaesthesia brought out a bit of the tumour and it was sent for biopsy. After a fortnight about half of the tumour was cauterised under general anaesthesia.

After this operation the patient had a severe reaction—the whole of the right side of the face became swollen and there was complete closure of the right eye. It responded to a course of 5 lakhs of penicillin with sulphanamide therapy. The right nostril had now some space through which the patient was able to breathe to some extent. A proof puncture of the right maxillary antrum was now done under local anæsthesia, which showed blood and pus and some granulation tissue in the discharge. Hence, at the next sitting, the opening in the medial wall of the maxillary antrum was enlarged, and through this the antrum was curetted from the nostril, and enough of polypoid vegetations were removed. The patient developed a severe reaction as before with a high temperature, rapid pulse, severe pain and swelling of the face and eyelids with closure of the eye. She was again put on massive doses of penicillin and sulphonamide to which she responded readily.

Case 3—Patient Z, a Hindu male aged 35 years was referred to us for favour of admission and treatment from the American Mission Hospital, Madura. The patient was having profuse bleeding from a tumour in the left nostril whenever the growth was touched. The tumour was removed completely under local anaesthesia in two sittings. At a third sitting, the area from which it arose, remnants of the tumour here and there were cauterised by galvanocautery under local anaesthesia. At each sitting the attempt was followed by severe bleeding which could be controlled by the usual methods. The patient was discharged, a week after the cauterisation, when he was able to breathe freely through the left nostril and did not complain of any bleeding at any time. Biopsy report of the bit removed revealed "capillary angioma".

KIDNEY STONES

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The subject of stones in the kidney has been taken up as the condition is much more common in U.P. and Rajputana than is believed by the average general practitioner. Whenever a patient complaining of renal colic or other symptoms pointing to renal stones comes to a practitioner he must not forget that his duty does not end by merely providing symptomatic relief to his patient. He must have his patient thoroughly investigated pathologically and radiologically to exclude the presence of stones or if present to have them properly treated.

Surgery Anatomy

Some cardinal points worth stressing are:

1. The right kidney is lower than the left.
2. The ureter lies posterior to renal vessels.
3. In front, the right kidney is in close relation to the ascending colon and duodenum and the left kidney to the descending colon.
4. The inferior vena cava is so near the right kidney that it is likely to be injured during removal of the kidney.
5. The kidney has two capsules, the outer fatty and the inner true capsule.

Etiology

The stones occur most commonly during the ages of 20 and 50 years. Both sexes are equally susceptible.

Mode of Formation of the Stone

The urine contains a number of crystalline substances, which are held in supersaturated solution through the protective action of colloids such as mucin.

The formation of stone may result from:

(*a*) Increased crystalloids excreted in the urine.

(*b*) Diminution, qualitative or quantitative, in the supporting colloids.

INCREASE OF CRYSTALLOIDS IN THE URINE—An increase in the blood calcium with a consequent increased output of calcium in the urine is one of the most important predisposing causes. Increased blood calcium may be due to:—

(*a*) Increased intake of calcium in the food;

(*b*) Lack of phosphorus in the diet;

(*c*) Increased absorption of calcium from the intestines, diet being normal;

(*d*) Withdrawal of calcium from the skeleton.

Increased intake of calcium in the food—The geographical incidence of urinary calculus is probably due in part to a local excess of calcium in the soil and water.

A map of urinary stone incidence drawn by McCarrison closely resembles the one of calcium distribution in India. The contrast is most vividly demonstrated in the following example:—

Dera Ghazi Khan on the right bank of the river Indus is rich in calcium. District Muzzaffargarh facing Dera on the opposite bank is a calcium-poor area. The difference in the number of urinary stone cases in the two districts is great. Whereas calcium-rich Dera Ghazi Khan has an incidence of 76 per lakh of the population, calcium-poor Muzaffargarh has only 45 per lakh.

Lack of phosphorus in the diet—Less phosphorus in the diet means less concentration in the ,blood whereas phosphorus-calcium ratio must be maintained. To do that, the blood has to get rid of some of the calcium through the urine.

Increased absorption of calcium from the intestines—The diet being normal such increased absorption may be influenced by excessive administration of vitamin D.

Withdrawal of calcium from the skeleton—This is seen in the most severe form in osteitis fibrosa in which, as a result of parathyroid over-action, the whole skeleton is decalcified. In this disease, urinary calculus is a common complication. A similar withdrawal of calcium from the skeleton is seen to a lesser extent, in any chronic bone affection and even as a result of prolonged decubitus. Thus urinary calculus is not an uncommon complication, in tuberculosis of bones and joints and even fractures treated by prolonged recumbency. Recumbency causes a dependent position of the renal pelvis thereby preventing proper drainage.

DIMINUTION, QUALITATIVE OR QUANTITATIVE, OF SUPPORTING COLLOIDS—The solvent property of colloids is influenced by a number of factors:—

(*a*) Any local lesion causing urinary stasis, predisposes to calculi which are common in malformations such as the horse-shoe kidney;

(*b*) Infection of the urine *e.g.,* prostatitis, cystitis etc.

CONSIDERATION OF OTHER FACTORS—1. *Salts*—Sodium chloride and sulphates have the property of preventing the formation of stones. This probably accounts for the fact that whales in their natural state do not suffer from urinary stones; and that in olden days the sailors, who used to eat mostly salted food were immune from stone formation.

2. *Hardness of water*—Temporary hardness of water is one of the most important causes of urinary stones.

3. *Deficiency of vitamins A and B*—Diets deficient in vitamins A and B encourage stone formation in two ways:—

1. By impairing epithelial nutrition of the kidneys.
2. By decreasing the acidity of the urine, thereby precipitating calcium phosphate.

4. *Cereals*—Robert McCarrison tried to prove that certain cereals have definite correlation to stone formation—that rice eaters are less susceptible than wheat eaters. This is true if the low incidence in Bengal is compared with that of the Punjab. Against this theory also there is an interesting observation: The inhabitants of Manipur (Assam) are chiefly rice eaters and yet they have the same stone incidence as the people of the Punjab and West U.P. where people are mostly wheat eaters.

5. *Climate*—It has been contended by some urologists that high concentration of urine may be a factor in the high incidence of stone in the tropics.

Against this, again there is an interesting observation : The District of Nasik with its most pleasant climate has the same stone incidence as the District of Jacobabad which is the hottest spot in India. Parts of the Punjab, where the annual rainfall is less than 20 inches has the same incidence as Manipur in Assam where the annual rainfall is more than 80 inches.

Types of Common Calculi

Stones may be primary or secondary.

Primary stones are those that arise in an apparently healthy urinary tract and are composed of substances normally present in the urine or as a result of metabolic disorders. They occur in acid urine and require no preformed nuclei. They are usually composed of oxalates, urates or uric acid..

Secondary stones are those that result from inflammation. Their formation requires a preformed nucleus which may be a primary stone, a foreign body, a clump of organisms or a mass of inflammatory exudate. They are formed in alkaline urine, since they are the result of liberation of ammonia from urea. They are invariably triple phosphates in composition.

Oxalate stones—After ingestion of food rich in oxalates they may be precipitated in the urine in crystalline form. Food rich in oxalates are spinach, tomatoes and asparagus. Strawberries are of ill repute in this respect but without reason, as their oxalate content is less than that of potatoes. Oxalate stones are very hard. They may be smooth and rounded or nodular and covered with sharp spicules. They irritate the nucous membrane and excite an outpouring of lymph and blood which renders them dark brown or black.

Urate and uric acid stones—They are partly of exogenous origin from meat or other animal food and partly of endogenous origin from breaking down of tissues. They are hard but smooth, yellow or brown in colour and usually round or oval.

Phosphatic stones—They are soft and friable, grey or dirty brown in colour. Often they attain a large size and they form the majority of "staghorn calculus" of the kidney. Since they often arise from staphylococcal or streptococcal infection that resists treatment, recurrence after operation is common. Worry and mental strain may cause these stones on account of excretion of excessive phosphates in the urine of such patients.

Pathology

Stones may damage the kidney either directly by trauma or indirectly by obstructing the outflow of urine. The most frequent and damaging changes take place following obstruction, leading to dilatation of the ureter, pelvis and calices and in many cases resulting in pressure-destruction of the renal parenchyma. Small kidney stones are more likely to cause obstruction than large ones, because the former can move in such a way as to cause intermittent obstruction. Usually the first gross changes following retention is a gradual enlargement of the kidney which may retain most of the normal markings. As the retention increases, the kidney becomes lobulated and finally a distended thin-walled sac results, filled with a pale yellow fuild—the hydronephrotic kidney. Destructive changes progress much more rapidly when infection occurs by way of urinary passages or more often through the blood stream—the pyonephrotic kidney.

Pathologically there are two types of pyonephrotic kidneys:—(*a*) The kidney is thick-walled and contracted round about the stone. This type is more common in cases of incomplete obstruction, where the kidney is making a constant effort to expel the stone.

(*b*) In the second type (see Fig. 1 of plate facing p. 180) the kidney is dilated bulbous or filled with fluid as in hydronephrosis, except that the fluid is thick greenish and foul-smelling. This type is more common when the obstruction is complete.

Stone and malignant disease—The majority of squamous-celled carcinomas (see Fig. 2 of the same plate) of the renal pelvis are associated with pelvic stones. Squamous-celled growths are more likely to result from chronic irritation, which is provided in this case by the stone and it is more than likely, that the early removal of the stone, might have prevented the formation of the growth.

Symptoms

Kidney stones may exist for years without causing symptoms. Symptomless stones are frequently discovered during an examination for other conditions or at autopsy. However, the majority of stones cause fairly characteristic symptoms, which are pain, renal colic, haematuria, passage of stones and anuria.

Pain—It is a fairly constant dull ache, localised to the kidney area, being most marked either in the back below the last rib or more rarely in the lower abdomen below the iliac crest which on the right side may simulate appendicitis. The pain may be increased by muscular exertion or sudden movements. The pain is due to distension of renal pelvis with urine from blocking of the pelvi-ureteral junction by stone.

Renal colic—It is one of the most characteristic symptoms. The colic is due to the effort of the kidney to get rid of the stone. The pain is usually severe and is described by the patient as "knife like" or "stabbing" in character and it usually "doubles him up". Coming on suddenly, it starts in the kidney region, radiates to the groin or the scrotum. The testes may be retracted by the cremaster muscle and may be extremely tender and remain so for sometime. Rarely it may radiate to the anterior and sometimes to the posterior aspect of the thigh. More rarely it may radiate to the shoulders, thus simulating gall-stones on the right side and angina pectoris on the left. For several days following the attack of colic there is a residual tenderness in the kidney area. Nausea or even vomiting occurs in severe attacks. There is a striking lack of constitutional symptoms in the uncomplicated cases. However, if the kidney is infected, the attacks of colics may be accompanied by chill and fever. The attack of colic terminates as suddenly as

it begins. Renal colic is present in about 50 per cent of the cases having renal stones. On the other hand it may occur in conditions other than renal stones, *e.g.*, in oxaluria and passage of blood clots in tumours of the kidney.

Passage of stones—The spontaneous passage of stones in the urine is an important objective symptom. The majority of these appear after an attack of colic, though sometimes they are passed without an attack.

Haematuria—Naked-eye blood in the urine is one of the symptoms that the patient may complain of. The fallacy is that the blood may be due to some other disease in the kidney or may come from some other organ of the urinary tract. The blood is rarely in sufficient amounts to affect the general health of the patient. The blood is increased after exercise.

Anuria—A sudden total anuria may be the first symptom of stone in the upper urinary tract. A common method of onset is rapid diminution and a final cessation of the urine.

Physical Examination

It is of little aid in the diagnosis of uncomplicated kidney stones. Nevertheless a careful physical examination should be carried out. There are two advantages:—

(*a*) Other lesions simulating the symptoms of stones may be found.

(*b*) Complicating conditions may be discovered:

(*i*) *Bimanual palpation of kidneys*—A kidney, which is unduly mobile or enlarged, will be grasped between the two hands. On the other hand, the kidney may be enlarged and yet not be palpable if it is wholly above the costal margin or obscured by the liver or a thick abdominal wall.

(*ii*) *Kidney pointing test*—The patient sits up; the examiner's index finger is pressed into the angle between the last rib and the erector spinae muscle. Distinct tenderness points to some pathological condition in the kidney.

(*iii*) *Murphy's thumping test*—Put a hand flatly in the kidney region and thump it with the other fist. Distinct tenderness points to some pathology underneath.

(*iv*) *Laboratory Investigations*—Microscopic examination of the urine may show R.B.C. or pus cells.

RED BLOOD CELLS. Red blood cells when present, are important in directing attention to the urinary tract in an otherwise normal case.

PUS CELLS. Pus cells when present, indicate infection plus stone. For obvious reasons one should insist upon a catheter specimen of urine in females.

ALBUMEN. Albumen in varying amounts would be present when R.B.C. or pus cells are present.

BLOOD UREA EXAMINATION. It should be carried out in order to have a general idea of the total renal function.

X-Ray Investigations

Valuable aid in diagnosis is obtained by this examination.

Simple Radiography. Both antero-posterior and lateral films are necessary.

A.P. View—After an efficient evacuation of the alimentary tract, the outline of a normal kidney should be visible, lying opposite the bodies of the 1st, 2nd and 3rd lumbar vertebrae and having an excursion of 1½ to 2" in forced breathing. The right kidney is slightly lower than the left. When reading the films two points should be kept in mind:—(*a*) whether there is a general enlargement of the renal shadow and (*b*) whether there is any well-marked shadow, superimposed in the renal area.

General Enlargement of the Renal Shadow. A good skiagram in a thin subject usually shows the outline of the kidney so plainly that one of them may be thought to be visibly enlarged. Marked enlargement may be due to congenital cystic kidney, hydronephrosis or pyonephrosis. The last two conditions have a bearing on the present subject, as they are sometimes the complication of a stone and their presence makes necessary a change in the line of treatment.

Presence of well-marked shadow superimposed on the renal area. If the shadow is triangular or branched, like the calices of the kidney, the diagnosis of a stone is practically certain. Besides the presence of a stone, the size, number and exact location can be determined.

Lateral view—A renal calculus gives a shadow superimposed upon the bodies of the lumbar vertebrae, unless the kidney is enlarged, when the shadow is displaced in front of the bodies.

Fallacies—(1) A shadow is thrown but it may not be due to stone in kidney.

(2) No shadow is thrown although a stone is present. When the shadow is not due to a stone in the kidney it may be due to:

1. Intestinal contents which cast a shadow on account of inefficient preparation of the patient, or if the patient has recently taken bismuth or magnesium salts. If in doubt, a second examination should be done after further purgation.

2. Calcification of abdominal or mesenteric lymph glands—The shadow of a calcified lymph gland is usually mottled in appearance.

3. Gall stones—They may give a shadow in the renal area on the right side. They are less dense and frequently multiple and faceted. In a lateral view the shadow of a gall-stone will occupy a much more anterior position. A gall-stone obstructed in the common bile duct may, however, throw a shadow opposite the body of the 1st or 2nd lumbar vertebra.

4. Calcified costal cartilage may throw a shadow —The lateral view will differentiate at once.

5. Caseous masses in a tuberculous kidney—The shadow is not as well defined as a calculus.

6. Calcareous area in a renal carcinoma—The shadow is ill-defined.

No shadow is thrown though a stone is present. This may be due to:

(*a*) Gas in the intestines.

(*b*) Stone lying in line with a rib.

(*c*) Presence of a non-opaque urate or uric acid stone.

Excretion Urography—This is a very valuable examination in stone surgery. The advantages are:

1. Determines the comparative function of both the kidneys.

2. Demonstrates coincident disease in the affected kidney, which may preclude an operation or vary the type of operative procedure.

3. Determines the functional capacity and disease or abnormality in the opposite kidney.

4. Demonstrates the intra-renal pelvis. One knows where exactly to find a pelvic stone in such cases, thereby avoiding lot of unnecessary trouble during the operation.

5. In cases with negative X-ray findings, the study of renal function by urography will often give valuable information. Gross abnormality of function on the side of the kidney causing symptoms indicates a stone or some other disease, thereby pointing necessity of exploring the kidney by operation.

Distinguished urologists like Cabot are of the opinion that visual estimates of kidney function by excretion urography is more accurate and satisfactory than the usual chemical tests of renal function.

Cystoscopy and Ascending Pyelography—These are not carried out by the author as a routine procedure because a proper excretion urography eliminates their need and is much less troublesome to the patient.

Diagnosis of calculus anuria—Calculus anuria must be distinguished from anuria seen in hysterical patients and in the terminal stages of nephritis. The clinical picture of the patient, suffering from calculus anuria is quite different from that of nephritic uraemia although both conditions produce an excess of nitrogenous bodies in the blood. In contrast to the convulsiive uraemic patient, the one with calculus anuria, in the early stages, is quite comfortable. His intellect is clear, oedema is slight or absent and gastro-intestinal symptoms are mild. The early state lasts about 5 to 7 days and on account of lack of symptoms is called "the tolerant stage." True uraemic symptoms follow later on. The lack of serious symptoms in the tolerant stage gives a false sense of security and the patient is allowed to get into an extremely hazardous condition, before it is recognised. It must not be forgotten, that anuria is always a serious condition and every effort must be made in arriving at an accurate and early diagnosis, so that proper treatment is planned and carried out before the final stage sets in. Hysterical cases may absolutely mimic calculus anuria and can be distinguished only by radiography. Where this evidence of stone is negative, hysteria is the evident diagnosis.

Prognosis

There is a saying "A man is as old as his arteries." It should be amended and said "A man is as old as his arteries and his kidneys." The prognosis will therefore depend upon the amount of damage the stone has done to the kidneys.

Treatment

(*a*) Symptomatic (*b*) Curative (*c*) Treatment of causative condition like cervicitis, prostatitis etc.

Symptomatic treatment—It may be of (*a*) renal colic (*b*) calculus anuria.

Renal colic—1. Hot water bottle; 2. Soap water enema; 3. Morphine and atropine subcutaneously in full dose, 4 hourly if necessary. In intractable cases morphia gr. 1|12 intravenously gives amazing relief. 4. Diuretics and barley water. 5. Antiphlogistine to the loins. 6. Hot hip bath at the onset aborts an attack in certain persons. 7. Cupping the loins. 8. Leeches.

Calculus anuria—By ureteral catheterisation, displace the stone back into the pelvis. If that is not possible, attempt to pass the catheter up by the side of the obstruction and leave it there. This will give a breathing time to carry out other investigations. If ureteral catheterisation is not possible nephroctomy should not be delayed.

Curative treatment—Some Vaids and Hakims claim to have effected permanent relief by medicines in patients suffering from renal colics due to stones too large to be passed. It should be remembered, however, that colic is a symptom of life; when the kidney becomes dead, the colics would automatically stop. Thus by avoiding operation in such cases irrevocable harm can be done.

Treatment depends on whether the stone is unilateral or bilateral.

Unilateral stones—For purpose of treatment these cases may be divided into three types. (*a*) Stones small enough to be passed. (*b*) Stones too large to pass. (*c*) Calculus pyonephrosis.

Small Stones—If the stone is small enough to be passed, no treatment except diuretics and urinary antiseptics may be necessary. The decision for or against the operation, should be made upon the evidence of the amount of damage the stone is doing. Thus small stones lying quietly in the lower calyx, when not producing colic and unaccompanied by infection may be allowed to remain. However, these cases should be followed up by radiographs at six monthly

intervals, to see, whether they are increasing in size. If the stone increases in size considerably, it should be removed. A stone in the infected pelvis is objectionable, and should it show no tendency to pass, it should be removed.

Stones too large to pass—Such stones are from 1 cm. upwards in size. Advisability of removing the stone depends upon the age of the patient. In old people they are best left alone. Old people can live comfortably on a reduced amount of kidney tissue. The days of rigorous demands on the kidneys are over and attempts to increase the amount of functioning tissue may be unwise and hazardous. On the other hand in younger people, the stone must be removed whether causing symptoms or not, as its presence is incompatible with the continued integrity of the kidney. Later on, infection is bound to take place and the avoidance of the operation now, may mean the sacrifice of the kidney later.

Calculus pyonephrosis—Such patients usually come to the surgeon in a fairly exhausted condition, as they had been victims of septic absorption for a long time. The undertaking of any serious operation in such cases would be unduly hazardous to the patient's life. Hence the first thing to do in such cases is to drain out the pus by a nephrostomy, scooping out any stones that come in the way. It is remarkable that after such drainage, the patients pick up enough strength in a short time to undergo any prolonged operation. However before undertaking a second operation, these cases must have fresh excretion urographs taken. It is amazing that mere nephrostomy sometimes permits us to revive some of these apparently functionless kidneys. However if the kidney is still functionless, it should be removed provided that the other kidney is in a satisfactory condition.

Bilateral stones—Old people are best left alone. In younger persons the question of which kidney to tackle first is rather ticklish. The general principle is that the kidney, which is the least affected should be taken up first, the reasons being—

1. If after operation, on the less diseased organ, the other kidney gets blocked, there is only slight impairment of renal function.

2. If the less diseased kidney is not operated upon first, it may cause obstruction, as it usually has smaller stones, which might easily get blocked due to increased compensatory activity of the kidney, following an operation on the diseased organ.

3. The less diseased kidney is the one likely to have caused the more recent trouble.

Depending on the health of the patient and usually 3 to 6 months after operation on the less diseased kidney, the other organ should be tackled and if necessary, removed.

Concomitant renal and ureteral calculi—Usually it is necessary to clear up the ureter before any surgical approach is made on the kidneys. The most satisfactory method is to remove the ureteral stone through a cystoscope. If that is not possible, then open operation would be needed.

1. If the ureteral stone is fairly high up on the same side as the kidney to be operated, then it can be pushed up into the pelvis and tackled through the kidney incision.

2. If the stone is well down, then it should be removed by extra-peritoneal lower abdominal route and this operation should precede the removal of stone from the kidney.

3. If the kidney is completely destroyed, mere removal of stone is useless. If the ureter above the stone is dilated, infected, and functionless, nephrectomy should be performed, removing the ureter to a point below the stone. On the other hand if the ureter is not dilated it is not necessary to remove the ureter with the contained stone during nephrectomy.

Operation—

Position of the patient—Lateral; some type of spinal support is essential.

Incision—The author uses the hockey-stick incision of Mayo. The lower part of the incision starts midway between the crest of the ileum and the last rib; it passes backwards almost parallel to the iliac crest until it crosses the border of the latissimus dorsi, where it turns upwards to end in the angle between the last rib and the spine. In cases where the 12th rib is rudimentery, this incision planned to pass close by the last rib (which in this case is the 11th, is much higher and the pleura, which generally comes down below the 11th, may be injured. In these days, when some form of x-ray evidence is always utilised for diagnosis, there seems little excuse for overlooking a short or rudimantery 12th rib. Even then, if the pleura is injured, one should immediately close up the tear putting penicillin through a small catheter, which is taken away, after the tear has been completely sewn up. No harm usually results. However such cases should be observed carefully for any signs of pleurisy or pneumothorax during the post-operative period.

The kidney is separated from its fatty capsule and freely mobilised by gently working with the index fingers over all its contours. On the right side, the last rib usually causes no obstruction in deliverance of the kidney. On the left side, as the kidney is placed higher, there may be difficulty. Cutting the last costo-vertebral ligament, usually permits the 12th rib to be pulled up well out of the incision.

The kidney having been delivered on the surface, must be held up. Two strips of small gauze sponges are passed under the poles, crossed on the sides of the kidney and held up by clamps by the assistant. The next stage of the operation will depend upon the site of the stone and whether or not the kidney has to be removed.

The following are the various operations, that are performed:—

1. Pelviolithotomy, *i.e.*, the removal of a stone from the pelvis of the kidney. 2. Nephrolithotomy, *i.e.*, removal of stone by incising the kidney cortex. 3. Combined pelvinephrolithotomy. 4. Resection of kidney. 5. Nephrectomy—It may be intracapsular or subcapsular.

Pelviolithotomy — Posterior pelviolithotomy is the operation of choice. Removal of stones through the pelvis does not destroy important structures;

large vessels are not divided; and an accurate anatomical closure is possible. The operation is easily carried out and is rarely followed by immediate or late complications. Certain points are worth mentioning:—

1. When the pelvis is more accessible on the front, no hesitation need arise about opening it on this surface.

2. The overlying fatty issue should be dissected away from the pelvis in a flap-like manner, whenever possible. This permits a more complete closure of the pelvis after removal of the stone.

3. A curved haemostat is used to search the pelvis and calyces for small stones. If the stone is not readilly located, the incision may be enlarged for inserting the tip of the little finger, which explores the pelvis and calyces. It is not possible to enter the calyces, but pressing down on the overlying parenchyma, the contained stone may usually be felt.

4. Before closing the wound in the pelvis it is essential to demonstrate the freedom of the ureter from obstruction. This is done by passing a ureteral catheter down.

2. Several soft rubber tissue drains are inserted down to the region of the kidney pelvis. The first drain is removed on the 7th day and all drains by the 10th day.

Nephrolithotomy—At present with our accurate means of localisation of stones, nephrolithotomy is rarely indicated for uncomplicated stones in the pelvis and calyces. Occasionally in secondary operations, when the kidney is fixed, it is necessary to remove the stone by this method. Small incisions through the kidney parenchyma may be made quite easily and are not followed by undesirable sequela. These sequelae are severe haemorrhage, infection and destruction of a large part of the kidney tissue. The destruction may be greater than what would result from leaving the stone in the kidney.

Complications—Haemorrhage and sepsis are the most common. It must not be forgotten that slight amount of bleeding occurs after all kidney operations, for 5 or 6 days. The urine is tinged with blood and no notice need be taken about it. When however the loss of blood is beginning to be felt, as shown by slowly rising pulse-rate, immediate action must be taken. First of all one should open up the wound and pack it. Then administer haemoplastin and morphia. If the hæmorrhage does not stop, the kidney should be removed.

Combined pelvionephrolithotomy — In certain cases the stone is lodged in the calyx from which it is impossible to bring it to the pelvis, the communication between the pelvis and the calyx being too small. In such cases the combined operation is the one of choice. The pelvis is opened and the stone is located either with the finger or with a pair of forceps. It is then pressed upwards towards the cortex and a small incision made over it with a knife or pointed forceps. If there is infection, the incision in the cortex should be drained. If no infection is present it is closed, with several interrupted catgut sutures.

Resection of the kidney—During the last decade the general tendency has been to be more conservative in operations on the kidney, as it is a sound surgical practice not to remove any tissue capable of functioning. Although the surgical technique is not yet sufficiently perfect to prevent the formation of sinuses, yet these when they occur, heal promptly. The important thing is that the stump of the kidney left behind must be assured of an adequate blood supply, before the vessels of the diseased part are clamped. Resection is of value, when destruction is confined to a localised area of the sound tissue, where local fibrosis is generally present and therefore the hæmorrhage is not copious. After resection, two layers of sutures, inner and outer, are applied. They are supplemented by through and through interrupted sutures. The incision should then be covered with the flap made from adjacent fatty tissue. In certain cases, resection may be the only operation possible, the other kidney being functionless or removed previously.

Nephrectomy—It is indicated when destruction of the kidney is so complete that besides being of no value, it is a positive menace to the patient and when the condition of the patient demands rapid operative procedures.

Intra-capsular nephrectomy—The kidney is removed with its capsule. The following points are worth mentioning:—

1. The kidney is tightly adherent to the surrounding structures, and the peritoneum and pleura are likely to be injured. The accidents if recognised early and closed up, will rarely cause trouble.

2. In cases with a short pedicle, the approach is rendered easier by dividing the ureter at a point below the kidney and freeing it upto the pelvis. This enables the operator to separate the pelvis from the vessels, thus diminishing the size of the pedicle.

3. The vascular pedicle is freed as much as possible by the removal of fatty tissue and fibrous bands.

4. To ensure safety the pedicle is doubly or triply ligated with stout chromicized catgut in a double strand.

5. Soft rubber tissue drains are left as usual and taken out after 3 to 5 days.

Subcapsular Nephrectomy—In some cases the fatty capsule of the kidney is so thoroughly adherent to the surrounding tissues on one side and the true capsule on the other, that its removal is practically impossible. This is specially true if some operation had been performed previously. Under such circumstances, one has to remove the kidney without its true capsule. After opening the capsule it is separated from the kidney by blunt dissection and folded down over the pedicle. The base of the kidney is now felt as a thickened mass, which includes the pedicle. It is extremely difficult to clamp such a mass. The danger is that the clamp might cut through the mass and bleeding takes place behind it. However in these extremely destroyed kidneys, the blood supply is

usually poor and only moderate pressure is required to control bleeding. If bleeding is not controlled the artery forceps can be left for 48 hours and then taken off. A subcapsular operation leaves behind a thickened and partially infected fatty capsule, which prolongs drainage and leaves sinuses. They usually close up after some time. It must be understood that this operation is not one of election but is usually forced on the surgeon as one of necessity.

Accidents—1. Opening of the pleural cavity—This has already been dealt with.

2. Injury to the intestines—Only three portions of the intestines are likely to be injured. On the left side the descending colon; on the right side the ascending colon and 2nd part of the duodenum. If recognised at once, the tear should be stitched up and recovery is the rule.

Complications—Paralytic ileus is fairly common after kidney operation and should be anticipated and dealt with at once.

Mortality—It is highest in nephrolithotomies and lowest in pelviolithotomies—nephrectomies are in the middle.

Recurrence—In most cases the period of stone formation is limited; when the stone-forming period (30 to 50 years) has passed stones are not likely to recur, following their complete removal.

The rate of recurrence is 24% after nephrolithotomies, 12% after pelviolithotomies, 6% after pelvionephrolithotomies.

Recurrence is most marked after nephrolithotomies as in some cases fragments of stones are left behind at the time of operation. Although recurrence is sometimes unpreventable, the following instructions to operated cases, when they leave the hospital, are of value:—

1. Take plenty of table-salt especially during the summer.
2. Avoid taking oxalate forming articles like spinach, tomatoes, etc.
3. Avoid mental strain and worry.
4. Take plenty of water to flush the kidneys.
5. Avoid too much of meat and other protein foods, especially kidney, liver and brain.
6. During any illness requiring prolonged recumbency, the patient should supplement his diet with vitamins A and B.

In conclusion it may be mentioned that any surgeon tackling stones in the kidney should be prepared to do a nephrectomy at a very short notice. Removal of kidney stones howsoever skilfully done is sometimes followed by severe bleeding, which can only be controlled by its removal. Nephrectomy in such cases carry a very high mortality but there are occasions, when both the patient and the surgeon may have to face the risk.

The abyss is worth a leap however wide
When life, sweet life, lies on the other side.*

*A paper read at the U.P. Provincial Medical Conference.

SPECIAL ARTICLE

TUBERCULOSIS CONTROL IN INDIA

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It is evident from vedic writings that tuberculosis was prevalent in ancient India. In the Rig Veda there is a hymn consecrated to the Cure of Yekshma which is none other than what is now known as tuberculosis. The writings of Susruta contain description of the symptoms and treatment of the disease. As long ago as 1829 Conwell wrote, "It is a generally received error that pulmonary disease in India is rare." As *Sil* in Northern India, and as *Kshaya* in the South, the disease has been known to exist for centuries. And yet, many large areas remained practically 'virgin soil' for tuberculosis, until a few decades ago. Lankaster wrote in 1920, "Phthisis has been for generations, probably centuries, a common disease of the larger cities yet even in these there has been considerable actual increase during the last 40 years—the disease of consumption has emerged from the quiet of the zenana into the open life of the people; it has been spread from the cities far and wide amongst the village districts; the people know it, and on all sides are asking for guidance as to a remedy."

GROWING CONSCIOUSNESS

From the post-mortem records of latent and healed tuberculosis supplied by Rogers and Pilgrim (1909), it was considered "that under proper conditions of treatment in a sanatorium in the early stages, the prevailing rate of mortality could be largely prevented. It was further thought that such institutions outside their functions as means of treatment, would serve even the more important one of acting as centres for the spread of knowledge amongst the people of the necessary precautions that should be taken in order to prevent the spread of tuberculosis to those who are healthy."

In 1909, the Medical Section of the Asiatic Society of Bengal discussed the tuberculosis problem and adopted the following resolution proposed by Lt.-Col. Pilgrim, I.M.S. "The Medical Section of the Asiatic Society of Bengal having discussed the subject of tuberculosis in Bengal, and its wide prevalence, are of the opinion that it is an extremely common cause of great suffering and mortality both among the European and Indian communities, and, therefore, venture to call the attention of the Government of India and the local Government, to the urgent necessity of providing a properly equipped sanatorium for the treatment of early phthisis, such as have now been provided with most satisfactory results in nearly all civilised countries."

At a discussion on tuberculosis during the second All-India Sanitary Conference in 1912, the need for investigation was stressed. After a fuller discussion had taken place at Lucknow Sanitary Conference in 1914, it was resolved that "Officers should be placed on special duty to study in detail the different problems affecting tuberculosis in India." The I.R.F.A. of the Indian Government appointed Dr. Lankaster for this purpose. His enquiry occupied two years (July 1914 to June 1916).

Dr. Lankaster visited 85 cities, including 29 with a population of over 100,000 inhabitants, interviewed doctors, missionaries, educational officers and various institutions in the course of his tour covering 35,000 miles. He submitted his report to the Government of India who forwarded it to the various Provincial Governments.

Early Anti-tuberculosis Efforts

In the years preceding the first World War, there was growing anxiety both on the part of the Government as well as the public, to deal with the tuberculosis problem. The Imperial Government, however, showed a justifiable reluctance in embarking upon large schemes involving heavy expenditure until an investigational survey had been made. Early efforts in the tuberculosis field were therefore, mostly by non-official agencies.

The only institution established under Government auspices is the King Edward VII Sanatorium at Bhowali, in the Kumaon Hills. It was established in 1912 out of public subscriptions and substantial grant-in-aid from Government. For the first six years it was under the charge of Lt. Col. Cochrane, I.M.S.

Almost all other tuberculosis institutions during the early part of the century were established through voluntary efforts. London Mission Society established a sanatorium in Almora in 1908. The Consumptive Society of Bombay opened a sanatorium in 1909 at Dharampur in the Simla Hills. A sanatorium with 50 beds was established at Parel by the Anti-Tuberculosis League of Bombay. A sanatorium which was started on the simplest lines at Madanapalle in South India was moved in 1915 to its present location at Arogyavaram where it has grown up to be one of the premier sanatoriums in India. The American Methodist Mission established in 1906 an open air institution at Tilaunia near Ajmer.

The first tuberculosis dispensary was established in 1913, by the Anti-Tuberculosis League in Bombay. A dispensary was started in Lahore in 1917 under the control of the Health Officer. Two more dispensaries were established at about the same time, one at Lucknow and the other at Madras.

As regards organised attempts to spread the knowledge about tuberculosis amongst the people, Bombay took the lead through the efforts of the Anti-Tuberculosis League. Later Lucknow, Ajmer and Karachi started their own Leagues for the same purpose.

The survey of activities up to 1920 shows that the efforts made were mostly by voluntary bodies and sporadic in character. There was, however, at that time evidence of "increasing unrest on the subject of tuberculosis" and genuine anxiety on the part of the people to protect themselves from infection with the dread disease.

Bengal was perhaps the first Province to adopt an organised extensive dispensary scheme, though Bombay City was the first to have a dispensary of its own. Since the meeting of the Medical Section of the Asiatic Society in 1909, various schemes were evolved in Calcutta, but none of them came to fruition. Perhaps the first practical tuberculosis effort was the establishment by private donations, of the Jadabpur Tuberculosis Hospital in 1923, under the auspices of the Calcutta Medical Aid and Research Society.

Bengal Tuberculosis Association

Substantial advance was made after the establishment of the Tuberculosis Association of Bengal in January, 1921. The first tuberculosis dispensary was opened in two rent-free rooms offered by the authorities of Chittranjan Hospital, Calcutta. The honorary services of some eminent physicians were secured and a special training course for tuberculosis home visitors was organised. A second dispensary was opened by the Howrah Municipality at the Howrah General Hospital six months after the first one was started. A third one was opened at the Medical College Hospital on 1st July, 1931. With a grant of Rs. 5,000|- from the Calcutta Corporation yet another dispensary was opened in January of the next year. An annual grant of Rs. 10,000|- by the Government of Bengal for propaganda work in 1933, enabled the Association to appoint two tuberculosis officers for publicity education and expansion in the districts. The fifth Calcutta dispensary was opened in 1935 at the Carmichael Medical College Hospital. The first mofussil dispensary was started at Krishnanagar in the premises of the Sadar Hospital in 1932. A second one was started in Dacca in November, 1935 and a third at Kalimpong. Later on two more were established, one at Darjeeling and the other at Barisal.

The Bengal Tuberculosis Association has been doing very good work in tackling the tuberculosis problem in its social aspect. In the year 1937, nearly 70,000 patients were examined at the dispensaries, including about 16,000 new cases among whom tuberculosis accounted for 4,000 cases. 31 trained tuberculosis health visitors paid 33765 visits to the homes of tuberculous patients. 4328 contact cases were traced of whom 604 were examined. 28.9% of these showed active pulmonary disease.

King George Thanks Giving Anti-tuberculosis Fund

A much needed stimulus for anti-tuberculosis work from the Centre was given when Lord Irwin raised a Thanks Giving Fund to commemorate the

recovery of His Majesty King George V from a serious illness. His Excellency decided that the Fund should be used for anti-tuberculosis work mainly in the form of propaganda. In any case this was to be the beginning of a serious effort to tackle tuberculosis. The amount at the disposal of the King George V Thanks Giving (Anti-tuberculosis) Fund was a little more than 9½ lacs, and although much good work was fostered by it, its resources were admittedly inadequate for the task.

King George's Thanks Giving (Anti-tuberculosis) Fund was raised in 1929, with the approval of His Majesty the King. The administration of the fund was vested in the Managing Body of the Indian Red Cross Society. A sum of Rs. 954,724|- was handed over to the Society on 8th November, 1930, with the recommendation that efforts should be concentrated on educational propaganda for the prevention of tuberculosis and that the interest from the Fund should be devoted to :—

(*a*) Demonstrations in hospitals, lectures to medical practitioners and students, organization of popular lectures through local bodies of Public Health Departments, the establishment of relations with existing tuberculosis hospitals and institutions and rendering help to them by visits and advice.

(*b*) Propaganda, through pamphlets, leaflets, charts, etc., in different vernaculars and through lantern slides and cinema films, etc. Dissemination of propaganda to be made through voluntarily constituted Provincial Committees or failing such committees through local Governments and local bodies.

(*c*) A survey of such parts of India as present abnormal conditions with the object of collecting information regarding the prevalence of the disease. The Organising Secretary of the Fund periodically toured Provinces and States, helped in the formation of Tuberculosis Sub-committees and gave public lectures as part of anti-tuberculosis propaganda. During the eight years of its existence the organization did considerable amount of publicity and propaganda through lectures, leaflets, charts, lantern slides, cinema films, and exhibitions. Apart from education of the public in matters pertaining to tuberculosis, the Fund ought to create interest in medical men in the preventive aspect of tuberculosis by organising periodic post-graduate courses at different centres. In their limited field with limited funds the organisers of the Fund did pioneer work for which they deserve congratulations.

Lady Linlithgow's Appeal

As a result of enquiries, Her Excellency the Marchnioness of Linlithgow, who has for many years been connected with anti-tuberculosis work in England, was convinced that active measures on a really adequate scale were urgently required in India. Lady Linlithgow decided to make an appeal for the sum of a million pounds to finance an All-India Anti-tuberculosis Fund which would also commemorate the accession of His Majesty King George VI to the throne.

The appeal was issued simultaneously in England and in India on 1st December, 1937, and as anticipated, received an encouraging welcome. In order to elicit good response from Provinces and States it was announced that 95% of the amount collected would be returned for local expenditure. Only 5 per cent of the total collection was retained for use at the centre.

A gross total of Rs. 85,07,888 was raised out of which Rs. 94,203 were spent to meet incidental expenses. The sum which was made available to the Centre amounted to Rs. 6,19,344.

Tuberculosis Association of India

Having collected the funds Lady Linlithgow proceeded with the formation of the Tuberculosis Association of India which was the eventual object of Her Excellency's appeal. The association was finally formed in Delhi and registered on 23rd of February, 1939. The Inaugural General Meeting of the Association was held on the 29th March, at the Viceroy's House, New Delhi.

In Her message on 24th February, 1939, Her Excellency said, "I think I can claim one of my aims, the education of public opinion in every class of the community, has been fully realised, and I feel confident that the enthusiasm which has been aroused will not abate until India has been delivered from this scourge. I have only begun what the people of India must complete. Permanent Anti-tuberculosis Association must now be formed in every Province of British India and in many of the States and it will be up to the people of those Provinces and States to see that money is not lacking for the carrying on of their work. I would like the people of India to look upon my appeal as the first successful engagement in a great campaign. After a period of rest and refreshment they should again advance and engage the enemy, an enemy far more difficult to subdue than any army of disciplined troops, an enemy which fight by stealth and lurk in every corner of every home."

It is evident that Her Excellency's idea was to entrust the task of fighting tuberculosis chiefly in the hands of voluntary organizations. This was in line with the history of anti-tuberculosis movement in other countries, chiefly America where it was left to private organizations to initiate active measures.

The objects of the Association are:—

(*a*) The prevention, control, treatment and relief of tuberculosis.

(*b*) The encouragement of and assistance in the establishment throughout India or Provincial and State Associations having objects similar in whole or in part to those of the Association.

(*c*) The affiliation or control of and the rendering of assistance to any institution having objects similar in whole or in part to the objects of the Association.

(*d*) The taking of such portion as may be entrusted to it of the King Emperor's Anti-tuberculosis Fund on such terms and conditions as may be agreed upon.

(*e*) The taking over of the King George Thanks Giving Fund and the administration thereof.

(*f*) The taking over of the assets and/or activities of any person or body for the advancement of the objects of the Association.

(*g*) The administration of endowments having for all or any of their objects the prevention, control, treatment and relief of tuberculosis.

(*h*) The collection, management and disbursement of funds raised or to be raised for all or any of its objects.

(*i*) The purchase or acquisition on lease or in exchange or by way of gift or otherwise of any real or personnel or immovable or movable property and rights or privileges necessary or convenient for its purposes.

(*j*) The sale, improvement, management and development of all or any part of the property and rights of the Association.

(*k*) The borrowing of money with/without security.

(*l*) The establishment and maintenance of Provident Funds or Pension Funds for the benefit of the employees of the Association.

(*m*) The doing of all such things as are incidental or conducive to the attainment of the above objects or any of them or which may be conveniently done along with or as subsidiary to the said objects.

During the first year of its existence the Association was able to procure the valuable services of Dr. G. Frimodt-Moller, C.B.E., M.B., as Medical Commissioner for a period of two years. Since his appointment he rendered help in the development of a number of Tuberculosis Schemes in Provinces and States advising on contemplated new projects as well as on the improvement and development of existing work. One of his first proposals was a system of organised Home Treatment. He succeeded in putting his scheme into practice after the model Tuberculosis Clinic at New Delhi was established in 1940.

Since its very inception the Tuberculosis Association of India has successfully continued the work of educative propaganda initiated by the King George V Thanks Giving Anti-tuberculosis Fund, by the distribution of pamphlets, leaflets, posters and charts. Training of doctors in the preventive aspects of tuberculosis has been a successful activity under the King George Thanks Giving (Anti-tuberculosis) Fund and this activity is, therefore, continued by the Tuberculosis Association of India. Year after year the post-graduate courses were organised with the co-operation and help of the heads of the Provincial Medical Departments, Medical Institutions and Anti-tuberculosis Organizations in different Provinces. The scheme for training of Tuberculosis Health Visitors which was also initiated by the King George Thanks Giving Fund is being successfully continued by the Tuberculosis Association of India. Every year about 10-15 candidates are being trained.

Another important activity of the Association is the Organisation of Tuberculosis Workers Conference every year. The first two conferences were held in 1939 and 1940. Owing to the preoccupation due to war, the third conference could be held only in March, 1945. The fourth one was held in November, 1946, and the fifth in January, 1948.

New Delhi Tuberculosis Clinic

Among the achievements of a permanent character was the establishment of a model Tuberculosis Clinic in 1940. The Clinic was built by the Association in the Irwin Hospital Compound at a cost of Rs. 100,000/-. The money for the maintenance of the clinic is being provided by annual grants of Rs. 25,000/- from the Government and Rs. 4,000/- from the Association. The management is vested in a Managing Committee consisting of seven members five of whom are appointed by the Association and two by the Government.

Lady Linlithgow Sanatorium, Kasauli

Another achievement of which the Association can be justifiably proud is the Lady Linlithgow Sanatorium at Kasauli. It was one of the cherished wishes of Her Excellency to establish a sanatorium on an All-India basis, so that it could be utilised as a model centre for training of post-graduates as well. Fortunately the existing buildings and site of Pasteur Institute at Kasauli were made available and with a Government grant of 3¼ lacs rupees the Institute was remodelled and the sanatorium was opened on 21st May, 1941. The sanatorium is to some extent a co-operative institution as regards its maintenance, the system providing a lien on one or more beds, in return for an annual contribution. Apart from annual grant paid by the Government of India, and some Provincial Governments, some of the Indian States as well as some of the affiliated associations, participate in its maintenance by annual payments. The sanatorium is managed by a committee appointed by the Tuberculosis Association of India. At present there are 190 beds of which 160 are in general wards and 30 in private cottages. 25 general beds are reserved for women. Of the 160 general beds, 118 are entirely free beds reserved by various Governments, Tuberculosis Associations and individual donors.

34 Associations in different parts of India are affiliated to the Central Association. In spite of the difficulties experienced during the war years most of them have done good work. General Hay in the annual report of the Tuberculosis Association of India for 1946, very rightly points out, "Many of our present activities may legitimately fall on Governments in the future years, but the responsibility for promoting pub-

lic interest in tuberculosis and for building up public opinion favourable to the support of official agencies is inevitably that of the Tuberculosis Association of India and its affiliated bodies."

The scope of the Association is immense. Unfortunately it is not in a position to extend its activities and be the main controlling and guiding factor in anti-tuberculosis schemes in India, as is done in some of the Western countries, owing to lack of funds. As in the years to come, it will be very difficult to raise funds by donations and subscriptions in this country, the State will have to tackle it as a problem of public health. While establishment of institutions like clinics and sanatoria will necessarily be the responsibility of the State, propaganda, education and encouragement of research should be the duties of the voluntary Associations. It is their duty to spur the Governments to activity wherever and whenever it is necessary.

HEALTH SURVEY AND DEVELOPMENT COMMITTEE

Another step forward in the Anti-tuberculosis field was taken by the Health Survey and Development Committee by very rightly including a comprehensive scheme for tuberculosis control in their recommendations. In their legitimate fear lest they should be accused of giving lopsided importance to any particular branch of medicine or public health they have erred slightly on the side of modesty. It should however, be explained that if the various governmental authorities would at least adopt the modest but excellent scheme put forward by the Bhore Committee they would be laying the foundation of a stable anti-tuberculosis organisation.

The findings and recommendations of the Bhore Committee are summarised as follows:—

"Annually about 500,000 deaths take place from tuberculosis in India and about 2·5 million open cases of tuberculosis exist in the country. These patients are continually disseminating infection among those with whom they come in contact. There is reason to believe that the incidence of the disease is higher in urban and industrialised areas than in rural regions. Owing to the migration of the labour population between industrial and rural areas and the increased facilities for rail and road transport, the tendency has been for tuberculosis to spread to the country side. Certain factors such as malnutrition and under nutrition and insanitary and overcrowded housing conditions also contribute their share to the dissemination of infection.

"An essential requirement for controlling the spread of tuberculosis is provision for the isolation and treatment of infective cases. As against an estimate of 2·5 million infective patients in the country the total number of beds available for isolation is in the neighbourhood of 6,000. The number of doctors with sufficient experience of tuberculosis work to qualify them for posts in tuberculosis institutions does not probably exceed 70 or 80, while those who have had a short course of four weeks in the subject may number about 250 or 300. Fully trained tuberculosis health visitors are in all probability, only about 100.

"This brief statement of the existing position should help to show the magnitude of the health problem which tuberculosis presents in this country and the total inadequacy of the existing facilities for dealing ing with it."

"OUR RECOMMENDATIONS"

In order to provide a comprehensive and integrated service the tuberculosis organization should include, (1) a domiciliary service, (2) clinics, (3) hospitals, (4) after-care colonies, (5) homes for the incurable and, in addition (6) certain ancillary services.

"A home isolation and treatment service:—A scheme for organised home treatment has been working in Delhi during the past few years under the guidance of the New Delhi Tuberculosis Clinic maintained by the Tuberculosis Association of India. This scheme has attained only very limited success, the reasons being (1) certain difficulties arising out of the war, (2) the extremely unsatisfactory housing of the poorer section of the community and (3) the inadequacy of the funds made available for its working.

"The question of housing seems to present the greatest difficulty, particularly in respect of tuberculosis patients of the poorer classes, who live in one-room tenements where isolation is impossible. We recommend that, as a part of the anti-tuberculosis campaign, local authorities should construct and maintain a number of suitable dwellings into which the patients and members of his family can be removed. Patients among the poorer sections of the community will, on such removal require to be provided with accommodation free of charge.

"The Tuberculosis Clinic :—The Clinic forms the centre from which curative and preventive work in tuberculosis will spread into the homes of the people. The treatment facilities it offers will help to cure a certain number of patients, while the more advanced cases will be sent for treatment in hospital. Those patients whose conditions is too advanced for attendance at the clinic, will receive domiciliary treatment from the medical and nursing staff of the clinic. During visits to the home the patient will be advised, by the doctor, and the nurse, to carry out effective isolation, contacts will be persuaded to attend the clinic for examination and early detection of the disease and steps will be taken to promote the welfare of patients and their facilities by establishing contact between them and voluntary organisations interested in welfare work.

"Tuberculosis Hospitals :—The provision of sufficient hospital accommodation to meet the requirements of the country is bound to take many years and therefore in the early stages, only such patients as are likely to benefit should be admitted to Hospitals.

"Our proposals for the developments of hospitals and slinics during the short-term programme are given below :—

The first five-year period :

(1) The establishment of a 200 bed tuberculosis hospital for each unit of 10 million population;

(2) The establishment of a large clinic (to be designated the Main Clinic) with facilities for the training of medical and non-medical tuberculosis personnel, at each of the places where the 200 bed hospital will be created and

(3) The establishments of clinics of a smaller type at the headquarters of each district in British India. The total number required, after deducting the 33 main clinics, will be 183.

Second five-year period :—

(1) 33 more 200 bed hospitals.

(2) 33 more main clinics at the same places where the new hospitals will be located and

(3) 183 more districts clinics.

"The clinics and hospitals can serve only limited areas around the places where they are located. Even so, in these limited areas, a domiciliary tuberculosis service should be organised in association with each clinic. A certain number of suitable cases will be sent by the clinic to the nearest tuberculosis hospital for more satisfactory treatment than can be provided locally.

"After-care of patients :—In a considerable proportion of cases tuberculosis patients do not completely recover their previous health and in order to prevent relapse, it is essential that less strenuous working conditions and a more hygienic home environment should be provided for them on their return from hospital. To meet these requirements after-care colonies should be established in close association with every tuberculosis hospital.

"Home for incurables :—The need here is for the provision of such care as will make the final phase of sickness reasonably comfortable for the patient. We recommend that, while Government should undertake the building and equipment of such institutions their maintenance can be suitably entrusted to philanthropic or religious organisations interested in social welfare, Governments undertaking to meet a substantial part of the expenditure through generous grants.

"Travelling Tuberculosis Units:—One way of extending the activities of the tuberculosis organisation outlined above is by providing travelling tuberculosis clinics based on the district clinic and working as far into the rural areas as possible. These units will have motor vehicles so equipped with all the necessary drugs and appliances, including provision for X-ray examination of patients, as to enable them to carry diagnostic and treatment facilities of a reasonably high order to the areas served by them. These units should have a fixed itinerary and should make about 3-4 visits per month to each of the 30 bed hospitals and dispensaries at the headquarters of individual primary units in the areas under the scheme. Apart from the diagnostic and treatment facilities which these units can offer, they should also help the tuberculosis campaign by carrying out intensive educative propaganda in those areas."

The existing arrangements for tuberculosis control in the Provinces and the Post-War Schemes contemplated by them are briefly surveyed below :—

The information that was gathered from the replies received to a circular letter sent round to administrative medical officers and heads of departments requesting them to state the existing facilities and future schemes for tuberculosis control in their respective Provinces is summarised in the following table :—

	Existing Facilities		Future Schemes	
Name of Province	*Number of clinics*	*Number of beds for TB in T.B. Institutions and General Hospitals*	*Number of clinics*	*Number of beds for T.B. in T.B. Institutions and general hospitals*
Assam	3	126	12	400
Bengal	15	596	?	1500
Bihar	17	232	38	The aim for 2000 beds but 300 beds will be provided now.
Bombay	9	1032	More clinics will be built, but the number is not given.	950 in 3 sanatorium of 300 beds each and a 50 bedded hospital. There are plans for others also.
C. P.	4	202	4	100
Madras	7	1038	?	330
Orissa	1	13	5	One sanatorium of 50 beds.
U. P.	15	680	35	750 and 20 beds in each divisional and district hospital.

It will be found that the existing facilities are totally inadequate throughout India. The schemes put forward by the Provinces vary in their provisions. Broadly speaking the emphasis in these schemes has been on the provision of treatment facilities. The preventive aspect of the problem has received insufficient attention.

Anti-Tuberculosis Scheme for India

Before making any concrete proposals regarding anti-tuberculosis schemes for the immediate future as part of a short-term plan, it would be worth while dwelling upon certain general considerations pertaining to tuberculosis control.

General Considerations

Importance. Random representative surveys in selected places in the Provinces of Madras and Bengal and the Punjab has clearly shown that tuberculosis is not only extensive in its incidence but is rapidly increasing in this country. Even the modest estimate of two and a half million people suffering from tuberculosis and five hundred thousand dying from the disease annually is sufficient to make it the most urgent Public Health problem in India. Though Malaria ranks first in importance in the department of Public Health, in my opinion, tacking the tuberculosis problem should have *top priority* at the present moment for the following reasons :—

(1) Inspite of the excellent work done by the Tuberculosis Association of India and the Bengal Tuberculosis Association, one can boldly say without fear of contradiction that no planned and organised effort on an extensive scale has been made to tackle the disease as a problem of social medicine. The very fact that there are hardly 6,000 beds available for the treatment of two and a half million patients shows that we have only touched the fringe of the problem.

(2) The disease incapacitates and kills the most productive part of the community as the highest incidence of the disease is among adolescents. Hence it is of the utmost urgency to wage a total war against tuberculosis in India in order to save the most useful part of the population from disease and death.

(3) Tuberculosis is the one disease in which the preventive and curative aspects of the problem are intimately interlinked and interdependent. The socio-economic factors like nutrition, ventilation, sanitation, etc., govern both prevention as applied to the community and cure as applied to the individual. Moreover, the most important factor in prevention consists in detection, isolation, and treatment of individual cases of open tuberculosis since they are the only sources from which the infection is disseminated. Considering the extent and the rapid increase in the incidence of the disease during recent years comparatively little has been done by way of 'care' of tuberculosis patients. All attempts have so far been sporadic and spasmodic. Hence tuberculosis should be considered as a problem which demands immediate attention.

(4) The total man-hours lost for the community through tuberculosis is greater than in any other disease as the period of morbidity and consequent incapacitation of individual patient is perhaps the longest on the average. The time has come to take urgent measures to minimise such collosal loss of man-power and man-hours.

Difficulties

How can a total war against tuberculosis in India be waged? What are the difficulties in the way of having a tuberculosis organisation for India on the lines adopted in some of the Western Countries. There are certain factors peculiar to India which ought to be borne in mind when planning an Anti-tuberculosis Scheme for this country. These are :—

(1) Owing to extreme maldistribution of wealth ninety per cent of the people live in a state of poverty with a standard of living which is perhaps the lowest in the world. Hence the scheme must be controlled and financed by the State.

(2) Standard and percentage of literacy are very low. The ignorance consequent on the same, militates against the success of modern scientific schemes. Education in problems of health and hygiene and intensive propaganda are therefore highly essential.

(3) The fatalistic attitude of the average Indian has to be borne in mind. It can be counteracted only by education and propaganda.

(4) There is an unjustifiable antipathy to institutional treatment born perhaps of reluctance to be separated from the family to which the Indian as a whole is intensely attached.

(5) Indian women in general are very reluctant to come out of their homes for attending out-patients clinics or for getting admitted in institutions. Most of them will not submit to proper examination by men doctors. Hence a fair number of women doctors will have to be enlisted for the success of the scheme.

(6) Housing conditions in Indian cities are far from satisfactory. Overcrowding and bad ventilation are the rule in the poorer parts of the cities. Hence adoption of domiciliary treatment should be done with caution and discrimination. The ideal is institutional treatment for all. When hospital beds are not available in any locality organised home treatment is the only alternative.

The above are but some of the difficulties in solving the tuberculosis problem. The obstacles are not, however, insurmountable provided the State assumes control of the organisation and directs the campaign and at the same time enlists the sympathy and support of the public by propaganda.

State Control

Without minimising the utility and importance of voluntary organisations in the conduct of anti-tuberculosis campaign the necessity for State control can be emphasised. If a campaign against tuberculosis is to be conducted with the grimness and determina-

tion of a total war, a State organisation for controlling and enforcing discipline on the same lines as in the Army is indispensable. It is not, however, suggested by any means that all military laws and regulations should be adopted for waging war against the tubercle bacilli. As compulsion is often required during the campaign, Government of the country will be the only body which can through legislation and enactments enforce laws and regulations which are essential for the success of any anti-tuberculosis scheme. Moreover, owing to abject poverty of 90 per cent of the population and the apathy of the other 10 per cent, voluntary contributions will be totally inadequate for the successful adoption of an extensive and efficient scheme to cater to a population of 400 million. If as has been suggested by competent authorities at least one bed for every death from tuberculosis has to be provided India will need at least 500,000 beds. Can we depend on voluntary effort to provide so many hospital beds for tuberculosis particularly in view of the existence of the peculiar conditions in India mentioned above? Voluntary help in that direction, however welcome they might be are bound to be sporadic and often erratic. Private organisations and bodies have their desirable and necessary place in the scheme with important functions to perform as will be indicated later. The control and direction of the scheme however should be the sole responsibility of the State. That it is the duty of the public, in other words the State, to provide for the scheme is clearly shown by the words of the American historian Garret Brown, himself a victim of tuberculosis, " If the public is to continue to have our protection from that against which it failed to protect us then the public must make it possible for us to get what we must have to live." In an article entitled " Social Aspects of Tuberculosis", I wrote as follows:—"If the community can demand of the consumptive to shape his life in such a manner as to prevent the dissemination of the disease, the consumptive has in his turn every justification to expect the community to be mindful of its own duties towards him who is suffering to a great extent because of the conditions which the authorities have permitted to prevail. They should not only see that conditions favouring development of phthisis should be eliminated but also provide shelter, proper nourishment and medical attention for those patients who are not in a position to procure them at their own expense."

The Scheme " F.I.T."

It is a great temptation to use Army methods of abbreviation and call the anti-tuberculosis scheme by the name F.I.T., in view of the fact that the whole control of tuberculosis consists in adopting efficient and proper methods for following the three necessary and sufficient instructions ' Find, Isolate and Treat.' Essentially a social disease, with high communicability through prolonged and intensive exposure to the causative organism, tuberculosis differs from all other epidemic infectious diseases in that prevention and cure are intimately interlinked. Apart from the fact that such environmental factors as fresh air, good housing and ventilation and constitutional factors like proper nutrition are common to both prevention and cure, control of tuberculosis consists mainly of isolation of infectious patients and conversion of sputum positive into sputum negative cases by proper and efficient treatment. Sputum containing tubercle bacilli coughed out by patients suffering from the disease is the infecting agent. Hence protection of the community from tuberculosis can be done only by finding out the diseased individuals, isolating them and treating them. An anti-tuberculosis scheme should be planned so as to conform with and satisfy the essentials of prevention enunciated previously under the term F.I.T.

A scheme for India should be based on the methods adopted in Western countries like U. K. and America for controlling tuberculosis with certain modifications to suit local conditions. A chain of institutions as shown in the attached plan, each one having a different function, forms the basis of the scheme. The institutions should be of sufficient number to meet the full requirements of the country.

Chest Clinic

The problem of 'finding' can be satisfactorily solved through the establishment of a number of out-patient clinics throughout the country at approximately one for every 100,000 of population. An out-patient clinic for tuberculous patients used to be called tuberculosis dispensary. There are two important reasons why such a terminology should be discarded in favour of ' Chest Clinic.' Firstly majority of those who are examined in the clinic turn out to be non-tuberculous. Secondly the social stigma attached to tuberculosis however unjustifiable it is cannot be overlooked. The average layman does not like to be known that he is attending a T. B. Clinic. The change in name is essential in order to increase the popularity of the institution which forms the most important link in the chain of Anti-tuberculosis Scheme.

Functions

(*a*) *Diagnosis*—The clinic is in the main a diagnostic centre. Patients who go to the clinic for diagnosis fall into four categories :—

(1) Those who are referred by private doctors for consultations.

(2) Those who go on their own.

(3) Contacts who are persuaded by clinic authorities to attend.

(4) Convalescents from other institutions for follow up.

The clinic should have proper X-ray and laboratory facilities. As screening will not be sufficient there should be radiographic department as well. Laboratory facilities should include among other things cultural examination for tubercle bacilli.

Treatment

The chest clinic is not as a rule a treatment centre. All active cases with constitutional disturbances ought to be treated as in-patients in special institutions. The treatment department of the clinic caters mainly to those patients discharged from hospitals and who are recommended periodic review and continuance of certain forms of treatment like pneumothorax refills, calcium and gold injections, etc. Cases however with minimal lesions with very little constitutional disturbances particularly when they are sputum negative can be treated in the clinic as out-patients. It is advisable that even these cases should have a short period of hospitalisation in order to learn the sanatorium routine. In a few selected cases under circumstances which prevent hospitalisation either as a result of reluctance on the part of patients or due to want of accommodation, pneumothorax can be started and continued in the clinic itself. For such cases provision should be made for stay in the clinic for a day or two. Treatment in the clinic for primary cases should as far as possible be discouraged.

Conduct of domiciliary treatment is one of the functions of the clinic. Home treatment should be advised only for those who can provide themselves with a separate well-ventilated room in their own houses. There should be facility for and ability and willingness to carry out proper isolation of the diseased person. Non-availability of beds in institutions is the only circumstance under which such an advice should be rendered. Owing to extreme paucity of beds for tuberculosis patients in India we are by necessity forced to adopt domiciliary treatment as a part of the scheme. If organised home treatment should be a success whole time staff should be employed for the purpose. A medical officer, a nurse, and a health visitor should form the home treatment team. They should be provided with motor conveyance preferably an ambulance which can also be utilised for bringing patients to the clinic for periodic X-ray and laboratory examination. The domiciliary treatment team will also be in charge of rounding up contacts and survey work with the special object of case finding. This leads us to the very important function of the clinic, namely prevention.

Social Medicine

The ideal method of prevention is isolation and segregation of all sputum positive patients. This unfortunately is an unattainable ideal because of the presence of comparatively symptom free cases excreting millions of bacilli, apart from active cases of tuberculosis living in promiscuity but none the less dangerous as source of infection. Once a man is registered in the books of the clinic every effort should be made to prevent contact infection. The main work, however, of the clinic in the field of social medicine is to round up all contacts of the patients and submit them to thorough examination and keep them under periodic observation.

Care Committee

Each patients' financial status should be reviewed and if he is a wage-earner and the prop of the family arrangements should be made for the payment of certain allowances to the family during the patient's period of absence from work. This should be part of the functions of the Care Committee, attached to every clinic. The Care Committee is purely a voluntary body, composed of philanthropic ladies and gentlemen belonging to the community to which the clinic caters. Voluntary donations will be handled by the committee and needy patients and their families can be helped therefrom. This is an extremely important item of social medicine in that it ensures the patient freedom from mental worry and the family the much needed financial help to keep them from starvation. The only answer one can give to the question why families of tuberculous patients should be cared for more than anybody else is because by keeping them under observation and above privation we remove a potential danger to the community as possible foci of infection.

The suggestion made in memo. 266/T of the Ministry of Health in the U. K. should be adopted in India as well.

Statistics

Complete and faithful records for all patients and contacts and report of the work done in the clinic should be maintained. They should be made available to the central tuberculosis institute for the work of all India co-ordination.

Survey and Research

Epidemiology of tuberculosis has not been systematically studied in India. Surveys should be constantly conducted in an extensive scale not only for the study of the incidence of infection and disease but also to find out the influence of environmental factors. Chest clinic is the place wherefrom survey teams can be sent out. Sufficient extra staff should be provided for the purpose. Mass Radiography should be made available at least in some of the important centres as for example in every Provincial Institute.

Institutions for In-patient Treatment

After process of case finding through the help of chest clinic, come the other two important items of control, namely, isolation and treatment. Provision of beds for in-patients treatment should go side by side with the establishment of chest clinics. Tuberculosis problem cannot be solved by merely finding out the number of people suffering from the disease. As I have said already, prevention of tuberculosis is essentially a question of isolation and treatment of diseased individuals. Hence adequate number of beds for patients is the urgent need which should be satisfied as quickly as possible.

Patients can be treated in special hospitals, sanatoria or in general hospitals.

Tuberculosis Hospitals

Easy accessibility should be the prime consideration governing the location of a special hospital for tuberculosis. It should no doubt be built on sanatorium model. But there is no need for it to be located in out of the way inaccessible hill tops. The main reason is poor people cannot afford the expense nor will they be willing to go far away from their homes. The other no less important reason in my opinion is the cure effected under the same climatic conditions as those the patients are living under, will be more permanent than the cure effected under different climatic conditions. A patient from Delhi who obtains arrest of his disease by treatment at Kasauli runs a greater chance of a break down after he comes back to Delhi to live under the same environmental conditions than if he had obtained his cure in Delhi itself. By saying so the utility of sanatoria on hill tops is not under-rated nor is the favourable influence of certain climate on tuberculosis denied. It is, however, certain that the importance of climate in the treatment of tuberculosis is very much over-rated. After all treatment—efficient treatment—wherever it is obtained is the main thing. Climate is of minor importance. All the sanatorium facilities minus climate can be obtained if a tuberculosis hospital is built in the outskirts of a large city in the area to which the hospital caters. There are large open spaces near the precincts of every large city in India. If a suitable site is selected (after all any site is as good as any other so long as there are good drainage and water supply) with enough vacant spaces for expansion, a settlement can be added to the hospital. Propinquity to civilisation, accessibility to the people in the area, and obtaining of cure without change of climate are the advantages of such a location for a tuberculosis institution.

There is, however, a difficult obstacle to overcome, namely, the antipathy of the general public against having a tuberculosis institution in their midst. It is unfortunate that this erroneous idea that the presence of tuberculosis hospital is dangerous to the public in that it will increase the incidence of the disease has been instilled in the minds of the laymen through the pernicious preaching of some old fashioned medical men whose ignorance of the disease is collosal and nonetheless deplorable. It is high time that the public is informed by propaganda that far from being a danger to the community it is highly beneficial to have in their midst such an institution into which as many of the patients as possible can be isolated. Sputum is the infecting agent. In a tuberculosis hospital the sputum of each patient is collected and systematically destroyed. In fact one can truthfully say that it is much less dangerous to be inside a tuberculosis hospital than outside for the simple reason that outside the hospital in a city, many a man and woman suffering from unrecognised tuberculosis living and moving about in promiscuity, coughing and spitting in the midst of crowds, are positively dangerous sources of infection to the public at large. These poor ignorant patients will continue to remain in every city so long as there is no special institution to look after them and isolate them in the city itself. The scare of the public regarding tuberculosis is so great that it will require intensive propaganda to eradicate the erroneous impression created in the public mind by misinformed individuals.

Tuberculosis hospital should not only provide for strict sanatorium regime including facilities for graduated exercises like open air walks, but also for all the modern methods of treatment both medical and surgical. There should also be a well equipped laboratory and an X-ray department.

The influence of mind over matter during the course of treatment is of the greatest importance. Every effort should be made to prevent the patient's mind from preoccupation with the disease. Diversional therapy so successfully utilized during the present war in military hospital can be instituted with very great benefit in institutions like tuberculosis hospitals where prolonged stay is bound to cause boredom and depression. This should be organised by the voluntary care committees who will work in conjunction with the hospital authorities.

Sanatoria

Though tuberculosis hospitals are the crying need sanatoria have their place in the scheme of things. Increasing the number of sanatoria at the expense of hospitals should be positively discouraged. Tuberculosis is no respector of status of individuals. It affects the idle rich as well. The rich can afford to go to distant health resorts and afford the luxury of change of climate. Moreover, they will never be satisfied unless wintering in Switzerland or internment in a distant sanatorium is prescribed. As has already been indicated, mind has its influence in the progress of the disease. These people will get well only with such costly prescriptions. Apart from the idle rich, there are certain cases of chronic tuberculosis which after a certain stage of improvement become stationary. They are found to benefit by change of climate. Such cases can be sent to sanatoria at State expense. For the common man, however, sanatorium is not the institution of choice or preferment.

General Hospitals

Owing to the total inadequacy of the number of special institutions in India general hospitals have definitely a place in the treatment of tuberculosis for years to come. A separate ward should be set apart in each general hospital, the number of beds depending on the total number of beds in the hospital. It should be in charge of a medical officer who has had special training in tuberculosis. In fact as district tuberculosis clinics will be attached to H. Q. hospitals, one of the M.Os. incharge of the clinic can be in charge of the ward as well. In the long run, it should be our

endeavour to treat all T.B. patients in special institutions only. It will be financially a cheaper proposition in that the buildings required for T.B. hospitals need be much less elaborate and maintenance much less costly than for general hospitals. Moreover, such a scheme will facilitate better administrative control, a unified tuberculosis service and uniformity in treatment and maintenance of records.

Invalid Homes

There is a certain number of patients who in spite of all forms of treatment do not improve. The percentage of incurable cases is very large at the present moment because of want of enough facilities for detection and treatment in early stages. If these patients are allowed to remain in their homes and move about among the healthy members of the community they are bound to spread the disease. The only way to avoid this positive danger to public health is by isolating them in Invalid Homes. I consider that they should form part of tuberculosis hospitals though medical attention, nursing care and facilities for accommodation need much less. A hospital of 200 beds should have provision for extra 50 beds in a separate block on a less elaborate scale to accommodate the incurables. The main reason why the invalid home should not be a separate institution is because it is bound to be extremely unpopular. I will not be surprised if sooner or later people begin to call it the 'death house.' Moreover, the majority of tuberculosis patients in spite of being on their death beds are so optimistic about their cure that they would refuse to get into a home for incurables. Besides, prognostication in tuberculosis is an extremely difficult problem. Patients declared incurable by competent men have obtained arrest of their disease by minimum of treatment. Tuberculosis is a disease in which as long as there is life there is hope. Why then should we destroy the hope of these patients by pushing them into incurable homes which they are bound to consider as lethal chambers on the portals of which they will imagine to read the line "all hope abandon ye who enter here."

Travelling Tuberculosis Dispensary

Owing to ignorance, illiteracy and poverty of the rural population in India, we cannot expect them to go out seeking medical aid instead of which medical help should be taken to them. Travelling Tuberculosis Dispensaries are necessary for this purpose. In this war, mobile surgical teams did yeoman work by carrying surgical aid right to the front line. Since rural areas contain the bulk of the population the only way by which specialist help can be rendered to patients in distant villages is by means of T.T.D.'s. A T.T.D. should be on wheels. It should have practically all the facilities that are bound in a chest clinic including X-ray equipment. Besides the function of treating individual cases, it should act as an efficient propaganda machine informing the rural population of the A.B.C. of tuberculosis control through posters, pamphlets, and lantern lectures and cinema demonstrations. Enthusiastic young men with missionary zeal should be selected to be put in charge of T.T.D.'s.

Tuberculosis Service

A separate tuberculosis service for each Province with a Director at its head working directly under the Surgeon-General should be immediately formed. The whole chain of tuberculosis institutions and their personnel will be financed and controlled by the State. All personnel should be recruited on terms of whole time service. Private practice will on no account be allowed to any member of the service. Remuneration for every member of the service should be sufficiently attractive including full compensation for private practice.

Training

Unless there are a sufficient number of trained medical men available it is impossible to start and run special institutions. Over 10,000 specialists are required to put into execution a comprehensive anti-tuberculosis scheme for India. Hence as a preliminary step a large number of post-graduate training centres at least one for each Province should be instituted. The syllabus and course of instruction should be of the same uniform standard in all the training centres.

Apart from training of specialists, under-graduate training in tuberculosis is essential. A didactic and a clinical course of training in tuberculosis should be included in the curriculum of studies for final year students. In order to enable the private practitioners to be conversant with modern methods of diagnosis, treatment and prevention, refresher courses should be conducted in every Province annually.

Those who are going to be Directors, Assistant Directors, and Superintendents of Hospitals require special administrative training. This can be organised in a central tuberculosis institute in the same manner that malaria institute is training Assistant Directors and Malaria Officers.

Central Tuberculosis Institute

The establishment of a Central Tuberculosis Institute on the lines of the Malaria Institute of India is under the active consideration of the Government. Besides teaching and conducting examinations, the Institute will function as an important research body, conducting experimental and epidemiological researches. Practically nothing has been done in the line of research in tuberculosis and it is high time a start is made in that direction. Perhaps the most important part of the work of the Institute will be co-ordination and guidance of tuberculosis work throughout India, even though there may not be administrative control over the organisations in different Provinces. Statistics will be collected and co-ordinated at the

Institute for the whole of India. In my opinion, an institute of the kind described above is of the utmost importance in a country like India and it should be started without any further delay.

Concrete Schemes for the Future

So far as concrete proposals for immediate implementation, are concerned the following aspects of anti-tuberculosis scheme need special emphasis.

Centre

(1) In order to induce and encourage the Provinces to implement Anti-tuberculosis Schemes, the Central Government might agree to grants to Provinces equivalent to half the cost of their Anti-tuberculosis Schemes.

(2) A Central Tuberculosis Institute might be established immediately at Delhi. A beginning has already been made by the institution of a Diploma Course in Tuberculous Diseases by the Delhi University. A centre for teaching and research with an All-India status should have top priority.

(3) The Central Government might give financial help to Delhi Administration to set up a model Anti-tuberculosis Scheme for Delhi Province. The scheme for providing six Tuberculosis Clinics and a 400 bed hospital put up through the Chief Commissioner and sanctioned by the Government in 1946 might be put into execution without delay.

(4) Two B.C.G. Laboratories might be established—one at Madras in association with King Institute and the other at Delhi as a part of the Tuberculosis Institute.

(5) Four B.C.G. Field Units might be formed to carry out vaccination in selected places.

(6) Two Mass Miniature Radiography Units might be established at Delhi and Madras respectively. They will work in conjunction with B.C.G. Field Units.

(7) Doctors with post-graduate qualification and experience in general surgery might be sent abroad for training in thoracic surgery. Side by side, one or more chest surgery centres might be established in India at suitable university centres. If necessary grants might be given for buying modern equipment.

(8) Streptomycin trials might be instituted under Central Government control.

(9) Tuberculosis Control Section of the Directorate-General of Health Services might be formed at the centre. A beginning has, however, already been made by the appointment of an Adviser. In America the Tuberculosis Control Division has a Chief Consultant and eight Regional Consultants for the eight districts into which the country is divided for purposes of tuberculosis control. Their main function is to supervise the anti-tuberculosis work in the States in his jurisdiction and submit his report. It is on their recommendation, the States get their Federal Grant to finance the schemes. If and when the Central Government begins to give grants to Provinces or initiate its own schemes, one chief adviser and two regional advisers might be appointed to begin with. As. B.C.G. vaccination is going to be introduced under Central Government Control, one Regional Adviser might be put in charge of the scheme.

As regards Provinces, the following proposals might be implemented immediately:—

(1) All the larger Provinces which have medical colleges and large tuberculosis institutions might be encouraged to establish post-graduate training centres in tuberculosis. For the present the Delhi centre can be utilised for training of candidates from smaller Provinces and Indian States.

(2) Headquarters of every district should have a tuberculosis clinic. Every large city with a population of a lac or over should have a tuberculosis clinic.

(3) Every general hospital with 100 beds and over should have 20 beds reserved for tuberculosis patients.

(4) Larger cities should have a tuberculosis hospital of 100 beds in each to start with.

(5) Adjacent to each hospital there should be an after-care and rehabilitation colony.

It is advisable to concentrate on urban areas as tuberculosis is much common there than in rural areas.

As part of a 10-year plan for a Province with 50 million population, the anti-tuberculosis scheme will consist of the following:—

Provincial Tuberculosis Adviser ..	1
Regional Tuberculosis Officers ..	17
Provincial Tuberculosis Institute ..	1
Tuberculosis Hospitals (250 beds each)	17
After-care colonies for 100 people ..	17
Main Clinics	17
Subsidiary Clinics	34
Mobile Clinics	51

The success of any anti-tuberculosis scheme will depend entirely on a well-integrated service manned by whole-time staff. Honorary and part-time workers have no place in a public health service, as the purpose of the scheme in controlling tuberculosis will be entirely defeated by such half-hearted and incomplete measures.

The ultimate aim of a long-term plan should be to establish a clinic for every 100,000 population and at least one bed for every death from tuberculosis.

JOURNAL OF THE

INDIAN MEDICAL ASSOCIATION

CALCUTTA, MARCH, 1949

LEPROSY AND LEPROSY RESEARCH INSTITUTE

There is an instinctive feeling of horror and loathing against leprosy—partly for the disfigured leonine face and the maimed and mutilated limbs of a leper and partly for want of a specific remedy, sure and certain in its effect against this terrific scourge of a disease among diseases, which the human body is prone to fall a victim to. At the same time, we owe it to Providence that it is far less contagious than many other diseases and requires prolonged and intimate contact with a leper in the infectious stage of the disease, in order that the disease may be transmitted from man to man.

From figures obtained from the West Bengal Leprosy Relief Association, namely that there are more than a million patients in the whole of India of which 20,000 are in West Bengal alone, leprosy becomes at once one of the major health problems of the country. Eastern side of India, particularly some areas in West Bengal, namely Bankura and the adjoining districts of Burdwan and Manbhum, have a very high incidence of leprosy.

A general survey of the population based on examination by experts has not been undertaken as yet to ferret out the early or nerve type of cases which respond fairly to an early treatment. The Public Health Department works at a great handicap for want of an adequate number of treatment and isolation centres to cope with the disease. It requires a great deal of public health education and propaganda to arouse the consciousness of the people in order that anti-leprosy works and preventive measures against other more fatal, but preventable, diseases may be undertaken and sustained at a high level of vigour and efficiency. It is essential that the Public Health workers should work in an intimate co-operation with the social welfare workers as well. There is, at present so much horror and hatred of leprosy that people try to hide any kind of suspicious skin lesion, including leucoderma and other non-leprous affections. They should be told the reason why this should not be so in their own interest. For, the earlier the disease is detected and brought under treatment, the greater is the possibility of a cure.

The State has a great responsibility to shoulder in this connection. The Fourth International Conference on Leprosy at Cairo in 1938 pointed out that the control of leprosy should be the "inescapable responsibility of the Government concerned." It is for them to initiate at once provincial anti-leprosy works on sound and scientific lines without wasting their energies and attenuating their efficiency by dividing their slender resources amongst the many and various so-called 'systems' of medicine. Besides leprosy is very largely a village problem. It must be a part of the planning for Rural Medical Relief to set up centres for segregating infectious cases and make arrangements for the treatment of leprosy in the rural dispensaries.

We highly appreciate the observations of India's Health Minister, Raj Kumari Amrit Kaur, presiding over the second session of All-India Leprosy Workers' Conference, which met at the Senate Hall of the Calcutta University in December last. She emphasised the need for co-ordinated efforts of Government and voluntary bodies, properly conducted scientific study and research, extensive health propaganda and well-organised services of social workers, particularly women, in order to combat and control leprosy. She also stressed the need for the organisation of refresher courses for medical men in leprosy, which is also very important. It is also equally important that the State should import chemists and technologists who can manufacture the antileprosy drugs such as Promin, and other sulphones along with the other essential chemicals so vital for saving life and ameliorating suffering in our country—a constant victim to the tyranny of tropical diseases.

It is only within recent years that leprosy received the recognition in international medicine. One of the proposals put forward by the Bhore Committee in respect of leprosy was the establishment of a Central Leprosy Institute. It is assuring to learn from the Hon'ble Minister of Health that the Government of India has, of late, appointed a committee to visit important leprosy centres in the country and select a suitable place for the location of the Institute.

The Committee appointed by the Central Advisory Board of Health in 1941 in its report "on Leprosy and its control in India" gave careful consideration to the question of the location of the Leprosy Institute. The Committee observed:—"Its location should, as far as possible, be central, with satisfactory communications in or near a rural area, where the disease is endemic. It should be near a large leprosy institution, where adequate clinical material would be available, and where therapeutic experiments could be conducted".

It is well-known that the incidence of leprosy is high in the eastern coast of India, starting from Madras in the south right up to Assam in the north-east including Orissa and West Bengal. Considering from the above points of view, namely centrality of location and accessibility from an endemic area—Calcutta would certainly deserve to have preference over any other place in the extreme north or farthest south. We understand, the claims of other places have been pressed forward in this connection. The proposal being to establish—not a hospital clinic, nor an asylum for occupation-therapy but a full-fledged All-India Research Institute, regard should also be had to the fact that the leprosy department of the Calcutta School of Tropical Medicine has been doing pioneer work in the matter of research and training of medical personnel in leprosy for the last 28 years.

The Report on Leprosy and its control in India—has referred to its activities in the following words:—

"Among the leprosy research centres in the world, may be mentioned the Phillipine Islands, Japan, Hawaii, South America and the research centre at the School of Tropical Medicine, Calcutta. India can claim to have established the first full-time leprosy research centre, which has in some ways given a lead in leprosy research."

It would therefore stand to reason and appear as far more advisable to utilise and expand the leprosy department of the School of Tropical Medicine, and convert the department into an All-India Leprosy Research Institute than to begin at the beginning and start laying the foundation stone of an altogether new institution in a new place.

Taking an over-all view and considering all these aspects cooly and carefully, Calcutta will be found to possess many great advantages for the proposed institution. We hope and believe the special committee will consider these facts and factors before coming to make their final recommendation about the location of the proposed Leprosy Research Institute.

NOTES AND NEWS

FIRST INTERNATIONAL B. C. G. CONGRESS

This Congress, which was held at the Paris Pasteur Institute, under the presidency of Dr. G. Guerin, was attended by delegates from almost every nation. More than one hundred communications were read before the four sections.

To the first section was entrusted the experimental study of B.C.G. and of the methods of its administration. Researches on the preparation of B.C.G. in its dry state have been simultaneously undertaken by Ungar and Muggleton (Great Britain), Rosenthal (United States), Kaiser (Austria) and Bretay (France). By his method for desiccating the vaccine at a low temperature, the latter has obtained a powder of B.C.G. keeping for months the vitality of the germs. Among other things, the preventive action of B.C.G. has been demonstrated by the experimental works of E. Bernard and Kreis, who found that guinea pigs previously vaccinated and superinfected with virulent Koch's bacilli respond better to streptomycin than the non-vaccinated ones. In the second section, dealing with the results of the use of B.C.G. in human beings, various methods of vaccination were discussed: Rosenthal's method (United States) of multiple punctures; Negre and Bretay's one of scarifications, especially used in France, and the intradermal route of Wallgren, preferred in Scandinavian countries. Professor Debre reported that in collaboration with the World Health Organization and the International Fund for the Relief of Infancy a "pilot station" is being created in Paris for the systematic study of the differences between the various technics of vaccination. This station will also be of use for the instruction of doctors and nurses. The work of the third section concerned the results obtained with B.C.G. in veterinary practice. It has been proved that B.C.G. vaccination on a large scale could largely diminish the extension of tuberculosis in cattle; for instance, in France, where 40 per cent of the cattle are tuberculin positive. The fourth section dealt with the conditions of application of B.C.G. in the field of preventive hygiene. Tonell reported the results of vaccination in a Swedish district of 100,000 inhabitants. Thanks to systematic vaccination in primary and secondary schools (18,000 vaccinations) from 1935 to 1946, no tuberculous meningitis has been observed in this district, and the mortality rate, which was 6 per 10,000 up to 1939, decreased to 2·6 per 10,000 in 1946. As emphasized by Wallgren and Guilbaux, the vaccinated patient must be kept free from contagious contacts for several months in order to realize immunization.

The Congress then passed unanimously, among others, the following resolutions: that over ten million vaccinations practised in the whole world for twenty-five years confirm the absolute inocuity of B.C.G. vaccination in human beings; that B.C.G. vaccination constitutes the most effective means of preventing tuberculosis; that the vaccine B.C.G. strain used in all countries originates from the Paris Pasteur Institute; that the technic confirmed by tests in Paris at the Pasteur Institute insures its vitality; that the Congress recommends the introduction of the vaccine through the skin, the modes of application of which are varied; that the Congress does not exclude the oral administration for practical reasons; that the Congress recommends the revaccination of subjects whose cutaneous sensitivity to tuberculin has disappeared; that the Congress considers urgent as widespread a diffusion as possible of the B.C.G. vaccination; that the Congress recommends the development of all other prophylactic measures employed in the fight against tuberculosis.—*J.A.M.A.*, **138**:228, 1948.

STEPS TO RAISE HEALTH STANDARD OF THE WORLD

The World Health Organization (WHO) is launching the first large-scale international medical research programme on tuberculosis as part of its efforts to raise health standards throughout the world. Approval of the $100,000 research programme and other projects was announced by WHO's executive board following a meeting at Geneva, Switzerland held sometime ago.

The first phase of the research already is under way. It is based on information obtained from the mass tuberculosis testing and immunization programme in Europe that is being conducted under the direction of the United Nations International Children's Emergency Fund. Individual cards are made out for each person tested, in the latter programme, recording all relevant information. These cards are then made available to WHO for research. It is estimated, the board said, that during the course of the European campaign, 50,000,000 children and youths will undergo tuberculin tests and 15,000,000 will be vaccinated with B.C.G. (Bacillus Calmette-Guerin). Similar campaign are planned for the future in other parts of the world.

The board, which is charged with carrying out WHO's policies and plans, also announced that it had authorized the creation of a bureau of medical supplies "at the earliest possible date." This bureau, the board explained, will advise governments on procurements of essential drugs, biological products, medical equipment, etc. In times of emergency the bureau will obtain necessary supplies for areas needing them.

In helping to stamp out venereal infections, the board reported, WHO will carry out an extensive VD control programme with the aid of the Children's Emergency Fund which has allocated $2,000,000 for combating the infections among mothers and children. Emphasizing the value of large-scale use of penicillin

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in the treatment of syphilis, the board said, WHO will undertake to stimulate production and distribution of the drug. It is still in short supply.

Research and studies in mental health also will be carried on by WHO. As part of this programme, comparative studies, a survey and demonstrations in the field of mental health education will be undertaken. Co-operation with other interested organizations in the mental health programme will be sought, the board said.

The board also revealed progress in setting up regional organizations of WHO in various parts of the world. The South East Asia office was opened at New Delhi, India, on January 1, 1949, to serve countries including India, Ceylon, Siam, Burma and Afghanistan. A working agreement also has been sanctioned under which the Pan American Sanitary Organization will service the Western Hemisphere. A special temporary administrative office is planned for Europe by January 1, 1949 to assist in the health rehabilitation of war-devastated areas.

Grants of $600,000 for fellowships and medical literature in the various WHO fields of specialization have been approved. The board also has authorized the sum of $800,000 for assisting member countries requesting specific aid. Two-thirds of the WHO member countries have asked for this help which provides demonstration services, assistance of expert teams, fellowships to train medical and public health personnel, and supplying medical and teaching equipment.—*Calcutta Municipal Gazette.*

SECOND COMMONWEALTH & EMPIRE HEALTH & TUBERCULOSIS CONFERENCE

Representatives from all over the world are already arranging to attend the Second Commonwealth and Empire Health and Tuberculosis Conference which the National Association for the Prevention of Tuberculosis is holding in London from 5th to 8th July, 1949. The Conference will give special attention to Commonwealth questions, but the opening session will be devoted to Tuberculosis as a world problem, because it is against this background that all other problems must be considered.

At the previous Conference in 1947 over 1,000 representatives from 50 countries attended, and the speakers and visitors will again come not only from the Empire, but from many other countries. The Dutchess of Kent, President of the NAPT, hopes to be present at the Conference, and others attending include the Duchess of Portland, Chairman of the Council, and Dr. J. B. McDougall of the World Health Organization as observer.

There will be sessions on:—

Trends in the modern treatment for tuberculosis including streptomycin & P.A.S.; regional, county and county borough tuberculosis schemes; organisation of comprehensive tuberculosis schemes in a British colony; problems in the prevention and detection of tuberculosis; psychological and social readaptation of chronic disease in industry; protection from bovine tuberculous infection.

The Chairmen will include: Sir Robert Young, C.B.E., M.D., F.R.C.P., Anthony Greenwood, Esq., M.P., Fred Messer, Esq., J.P., M.P., Andrew Morland, Esq., F.R.C.P., N. Lloyd Rusby, Esq., M.A., D.M., F.R.C.P., Professor W. H. Tytler, B.A., M.B.

India and South Africa were strongly represented to the 1947 Conference, when Dr. P. V. Benjamin and Dr. F. J. Wiles read most interesting papers. The organisers expect that these countries will again send important delegations.

BONE BANK

After the eye bank and the blood bank, comes the news of the development of the bone bank at the New York Hospital for Special Surgery. It is only within the past few years that techniques have been developed for removing a piece of bone from one person and grafting it into the bone of another. Usually the piece has been taken from tibia (shin bone) of a willing relative who has for his generosity become a patient himself. And while this technique continues to be used the bone bank will in future save a good many relatives from sacrificing themselves as sources of bone, and make possible successful operations on many patients who have no donor to call upon. According to an article in Harper's Magazine, bone for the bank is obtained in a variety of ways, but principally from amputated limbs and from patients who are under going orthopaedic surgery. The bone is cleaned of surrounding tissue, swabbed for a culture test and placed in a fruit jar which is then sealed with a rubber diaphragm and placed in a deep freeze kept at temperatures as low as 25 degrees centigrade. This bone removed under sterile conditions has been kept as long as over 150 days, before being used to pack a cavity or employed in what is called a "massive graft". When the bone is needed, it is removed from the deep-freeze, thaws at room temperature in about ten minutes, and is ready for use. A careful record is kept of each piece of frozen bone together with the essential medical history of the patient from which it was obtained so that the proper piece may be selected by the surgeons for grafting purposes. The bone which is grafted does not grow; it stimulates the growth of new bone from the healthy bone on which it is grafted. —*Hindusthan Standard.*

NUTRITIVE VALUE OF MEAT EXTRACT

Meat extracts were first prepared by Liebig, more famous as the father of organic chemistry, about the

middle of last century. When they are produced commercially their attractive taste and their property of stimulating appetite and digestion soon earned them a high place in public favour. These virtues have never been seriously questioned, and in recent years controlled experiments have been made to measure the ability of the extracts to increase gastric secretion and the tone of the gastric muscle (FISHER & APPERLY—*J. Lab. Clin. Med.*, **26**:823, 1941). The claim that meat extracts improve stamina and muscular performance was less generally accepted, except by military hygienists. Early dietitians, indeed, found that they were poor sources of proteins, carbohydrates, and fats, the only types of nutrients then recognized, and therefore proclaimed that they had little value as food. The discovery of vitamins at first did nothing to improve their reputation, since vitamins A, B, C, and D—the first to be recognized are absent, or present only in negligible amounts.

According to Rees and Salway (*Chem. Ind.* **22**:202, 1947), modern research on the vitamin B complex has placed meat extracts in a more favourable position. Because all the vitamins in this complex are water soluble, and because one part of extract represents 25-30 parts of meat, it would be expected the vitamins which are found in meat would be present in much greater concentration in the extract. This is not the case, however, in so far as vitamin B is concerned, since the small amounts which are present in the meat disappear during the process of extraction. Nicotinic acid, on the other hand, is highly concentrated, beef extracts containing 1·0-1·2 mg. per g. as against 0·024-0·102 mg. in the original meat. Riboflavin is concentrated in about the same ratio. These values imply that 10 g. of meat extract daily, or about 2-3 breakfast-cups of beverage, would meet the needs of an adult for nicotinic acid. As much as 30-40 g. of extract, however, would be necessary to provide the required quantity of riboflavin.

It may be asked whether these considerable amounts of vitamins are wholly or in part responsible for the value of the extracts as stimulants. There is little doubt that their ability to increase appetite is due to their high content of "meat bases," such as carnosine, anserine, adenosine, creatine, etc. Frankau (*Brit. M. J.*, **2**:601, 1943) has described experiments in which a diet rich in nicotinic acid was found to improve muscular performance and stamina and increase efficiency when severe tests involving both physical effort and co-ordination were undertaken. Such an important finding obviously requires confirmation and correct interpretation before receiving general acceptance, but it is at least possible that the views of the early military hygienists will at last be supported by some scientific justification.—*Brit. M. J.*, **1**:350, 1948.

CORRESPONDENCE

TO THE PROFESSION

Sir,—The following poem was composed and read by me at the time of gathering of medical workers during the last Congress Session at Jaipur. It was appreciated much by Mr. Tiwari, the Education Minister, and Dr. S. C. Mehta, the principal of the Medical College there.

1. Listen! medical officers,
   What I have to say;
   How we have worked,
   During these days.

2. Greeted patients,
   With mild voice;
   And cheerful mood,
   With words of choice.

3. Thought as if Gods,
   Have come in disguise;
   Attended properly,
   With behaviour nice.

4. Did not hurt feelings,
   Of mankind;
   Less of a patient,
   With perturbed mind.

5. Presented service,
   To the Congress;
   Dr. Bhargava prays,
   For heavenly bless.

6. Putting my views,
   In poetical prose;
   Wrote it to-day,
   When I arose.

I am etc.,

R. D. BHARGAVA, L.C.P. & S.

Ratangarh, 3-1-49.

A CASE FOR DIAGNOSIS & TREATMENT

Sir,—In reply to a querry regarding the diagnosis and treatment of a case reported by Dr. L. C. Kacker (Kanpore), in your Journal of December, 1948, on page 88; I wish to state the following:—

Although the data given are insufficient, from the description given the case appears to me, to be one of 'angioneurotic oedema'.

I would suggest treatment with Benadryl (P.D.) during the attacks, and a course of Lertigon injections (P.D.) afterwards.

Thread worms are to be eradicated, and then a course of six injections Calcium 10 per cent (Sandoz) given intravenously, twice a week.

It is just likely that the patient may be hysterical and hence general tonic treatment with change of place would set the things well. I am etc.

K. W. PARADKAR, L.M.P.

Jalgaon E.K., 27-2-49.

THE U.P. SENIOR P.S.M.S. OFFICERS

Sir,—In revising the scale of pay of the P.S.M.S. Officers, the U.P. Government has not considered the case of the seniors. They have already been in the old scale of pay, *viz.*, Rs. 70—160—S.G. 175—200. The revised scale of December last is Rs. 120. E.B. 160—8—200.

The approximate number of the seniors in service is about 50. 2 per cent of the total cadre are drawing selection grade pay of Rs. 200, 10 per cent are getting Rs. 175 also selection grade, and the rest are receiving Rs. 160 p.m.

The combined total cadre of the P.M.S. II and P.S.M.S. is approximately 450 for all practical purposes, as is evident from the facts that they, *e.g.*, P.M.S. II have been drawing the same scale of pay as the Junior P.S.M.S. officers *viz.*, Rs. 60—130—S.G.—150; the stations of their charges have been common; promotion to the P.M.S. I have also been common from the same cadre of both; and both are under one administrative head, namely, the Dy. Director of Health and Medical Services.

The pay of all the senior P.S.M.S. officers would have been a selection grade pay and none of them could have been on Rs. 160, had their pays been calculated on the total cadre of 450. As a good number of the seniors are even today drawing Rs. 160 p.m. this shows that the seniors are one with P.M.S. II so far it only concerns them as a losing game.

Now, the pay of the P.M.S. II is revised in December last, with effect from April 1, '47, therefore, their cadre would be separated. Before this is done, it is, therefore, the birth-right of the seniors to be promoted to the selection grade pay of their scale prior to the date mentioned above (1-1-47).

There has been an appreciable difference both in minimum and maximum as well as in selection grade pay of the seniors and juniors. At least, the old seniors deserved the same proportion of increment of pay, though it ought to be more, as the domestic responsiblities increase with the age.

The only consolation to the retiring hand is the betterment of his pay, position, and pension. The seniors are denied all the three Ps: as their pays are not revised; their position, by promoting them to the P.M.S. I., is not enhanced; and their pension is not increased.

Instead, they have been losing in every way: They were the first target of the retrenchment axe between 1920 and 1924 which reduced their cadre and consequently their promotion to the selection grade pay; abolition of recruitment to the P.S.M.S. further affected their selection grade pay adversely; promotion of the P.M.S. II to the P.M.S. I officers further deprived many seniors of their legal right of promotion to the P.M.S. I as 3 per cent of the P.M.S. I cadre is reserved for the P.S.M.S. officers and not for the P.M.S. II; Conversion of the P.S.M.S. stations of choice to P.M.S. I charges has been a concrete loss to the seniors in their old age; age and period of retirement often disqualify them for promotion to P.M.S. I; and at the end of their journey the seniors go with their bag and baggage, with heavy hearts and in humiliation, having built both the health and the medical departments in the remotest corners of U.P., and having served their mastters, the masses, in their sufferings.

The hard, arduous and risky services of the seniors have been totally ignored: there was, during the infancy of the health department, hardly any cadre to help the needy villager during epidemics, when the seniors, on deputation, were meeting epidemics at the risk of their very lives—many of them having actually lost theirs; the seniors served the congress guests of His Majesty in jails well at the risk of their services even; the seniors examined huge number of recruits for War and treated their families left behind in hills and in plains, and attended the soldiers themselves when they came on recreation leave; carried out the work of the civil department: and the seniors of these provinces, during the last war, worked, on deputation, in war zones of other provinces like Assam.

The only fault of the seniors is that they did not join the last War in bulk: this was due, solely, to the dictum of the congress itself; and also because the seniors remembered well, how the bureaucratic British Government turned down their claims for the betterment of their status, when they, the products of the Agra Medical School, formed the biggest number from India on the War Medical Services in the First World War; Strange enough! the very Congress which dictated the country to keep aloof from the War services in the last War, now, being in power, is going against its own dictum, treating the seniors adversely!

It may be pointed out that huge sums must have since accumulated in the pension fund of the seniors and therefore, the Government will not be a losing party in giving a pension of Rs. 150 p.m. to them.

It is, therefore, the vital duty, and concern of the National Government to console and satisfy these retiring hands by promoting them all to P.M.S. I by creating a special cadre for them only for the time being on a consolidated pay of Rs. 300 p.m.; or to make them P.M.S. II on Rs. 300 p.m.; or at least give them a consolidated pay of Rs. 300 in the P.S.M.S. scale with a pension of Rs. 150 p.m. irrespective of the fact whether three years aggregate brings this sum or not. I am etc.

B. B. LAL DIKSHIT.
Provincial Secretary,
U.P. Provincial Branch, I.M.A.

Chandausi, U.P.,
27-2-49.

REVIEWS

THE NATURAL DEVELOPMENT OF THE CHILD: A GUIDE FOR PARENTS AND TEACHERS—By Agatha H. Bowley. Third Edition, 1948, Double crown, 16 vo. pp. 190+xvi. E. & S. Livingstone Ltd., 16 & 17, Teviot Place, Edinburgh. Price 8s. 6d.

This landmark in child development is in its third edition and sixth printing. In this edition the chapter on Adolescence has been enlarged. This is but natural as no development history of the child can be considered as complete unless the turbulent period of adolescence with its difficulties are well provided for. We recommend the book to all who are interested in the child.

N. G. MOJUMDAR.

OCCUPATIONAL AND PHYSIOTHERAPY-SCOPE, TRAINING AND PROSPECTS—By R. H. Finnegan. Double crown, 16 vo. pp. 128. The Actinic Press, 555, Lea Bridge Road, London, E. 10. Price 6s. net.

This small booklet is divided into two parts. The first part describes the occupational therapy and the second physiotherapy.

The book describes the history, scope and training available in England and some of the methods. It may be read with advanatge by all who want to take up any of these lines as a career.

N. G. MOJUMDAR.

PSYCHIATRY FOR EVERYMAN—By J. A. C. Brown. Crown 8 vo. pp. 237. Published by Philosophical Library, 15, East 40th Street, New York. Price $3·00.

There is hardly any individual who can be taken as absolutely ideal if a thorough psychological examination is made; moreover, Freud has shown that the mental mechanisms that work in the minds of both the psychologically normal and abnormal individuals are exactly the same; it is imperative, therefore, for everyone to inquire about the psychological and psychiatric problems that face them both individually and socially.

There are books on psychology which can be read and well appreciated by the lay man, but as a book on psychiatry for the public, this is the first attempt and a great success as well, coming from the hands of an expert teacher. The writer has described the principles in the doctrines of Freud, Jung and Adler, the various psychoses, psychoneuroses and amentias as well as the recent physical methods of treatment in such a simple lucid style that the reader will be taken through it as if he has been going through some light literature.

The name is quite appropriate—it is a book for everyman—be he a layman, a student of psychiatry or even the teacher in the subject.

The publishers are to be congratulated for the nice get up of the book at such a price.

C. SAHA.

A TREATISE ON DISPENSING, NURSING AND HOSPITAL EMERGENCIES—By Mohd. Ramat Elahi Siddiqui, P.M.S (Retd.) Double Crown 16 vo. pp. 552+vi. Price Rs. 10-8-0.

This is a book for compounders, nurses and hospital attandants. The book is divided into 22 chapters and 4 appendices. In the chapters dealing with diseases, treatments are also described. Appendices consist of table of solubilities, preparation of commonly used prescriptions, official and non-official preparations of some important drugs, posological table. In the posological table both official and non-official drugs have been arranged alphabetically. We hope the book will be of use to those for whom it is meant.

N. G. MOJUMDAR.

MATERIA MEDICA OF PHARMACEUTICAL COMBINATION AND SPECIALITIES—By U. B. Narayanrao. Fourth Edition, 1948. Crown 8 vo. pp. xlvi+339. Publishers "Medical Digest", Girgaum, Bombay 4.

This is a book which contains a list of over 2,000 'patent medicines'. These medicines are arranged alphabetically and against each drug a detailed description is given, as far as possible. The therapeutics is written as from pamphlets from the manufacturers.

In these days when 'patent medicines' in hundreds are flooding the market, it is almost impossible for the doctor to remember names of all these products. This book can help the doctor to solve this difficult problem, if he is inclined to prescribe a patent medicine. The complier must be congratulated for this uphill task.

.B P. NEOGY.

YAKSHAO SHARE! (Tuberculosis is curable!)—By Pashupati Bhattacharyya. Published by Dr. S. N. Bagchi, Bangiya Bignan Parishad—92, Upper Circular Road, Calcutta 9—in Bengali. Price Rs. 2/8-.

Dr. Pashupati Bhattacharyya, is one of the very few doctors in Bengal, who can write books in lucid Bengali. He is well known as an author. This attempt to educate the lay public about tuberculosis is

not only praiseworthy but should be imitated by all other languages of India.

The book is divided into several chapters. The author has rightly started from the historical back ground and has described the cause, diagnosis and treatment in a easy reading non-technical language. The book has successfully served the purpose for which it is written. It is hoped it will be well received by the public.

The printing mistakes must be corrected in the next edition.

B. P. NEOGY.

THE MEDICAL ANNUAL, 1948 (66TH YEAR)—Edited by Sir Henry Tidy and A. Rendel Short. Demy 7 vo. pp. lxvi+477. John Wright & Sons Ltd., Bristol, England.

The medical annual is a feature in medical literature every year. Although a little late, this years publication comes out with all its specialities in neat, lucid and detailed abstracts of almost all important publications during the year under review.

B.C.G. is drawing a lot of interest here and abroad. For this world wide interest the work of a small number of Scandinavian scientists and the results laboriously amassed by them, have been mainly responsible. The safety of B.C.G. is to-day accepted by world opinion as established. It has a significant and valuable protective effect, though the degree and duration of immunity is still somewhat uncertain. Mouth vaccination has now been discarded. Three methods of parenteral administration have been advocated ***vis.***, subcutaneous, intracutaneous, and multiple needle puncture. There appears to be a tendency to return to the intradermal method as more reliable and exact. The chief complications following parenteral injection are abscess formation and regional lymph node enlargement or suppuration. The incidence of such lesions varies widely with different workers. In the first application of B.C.G. and in most subsequent trials two conditions have been considered essential, that those vaccinated should be free from tuberculous infection when vaccinated and should be protected from exposure to infection after vaccination, until resultant immunity may be assumed to have developed. The first condition was most conveniently fulfilled by vaccinating new-born infants. The second condition aimed at avoiding natural infection before immunity from B.C.G. had developed. In the modern Scandinavian work isolation is continued until a positive tuberculin reaction appears, the first test being made at six weeks in Sweden, at eight weeks in Denmark. Those still negative at these times are revaccinated. When isolation is not possible Holm says "Where isolation cannot be carried out and therefore either no vaccination can be made or the vaccination must be made without isolation, we choose the latter course". It is common American practice to avoid strict isolation if possible but general control measures usually reduce the degree of probable exposure to a low level.

It is doubtful at the present stage to draw any clear proof of protection in Europe or North America by an exact statistician because tuberculosis is already on the decline due to various reasons. This proof is more likely to come from people of the East in susceptible races or in communities with poverty and low living standards. It is possible that B.C.G. may prove an agent of outstanding value as an economically practicable measure in situation where control system of Europe or North America may be impossible for years to come.

While prohibition is being extended to larger areas in India, it is desirable to draw the attention to methyl alcohol poisoning. Methyl alcohol is readily available because of its extensive use in industry. After a period of 12 to 24 hours symptoms appear in the following order: lassitude, anorexia, nausea, vomiting and giddiness. Severe cases exhibit mental confusion progressing to comas with dilated pupils which react feebly or not at all and bilateral amblyopia or amaurosis. The severity of symptoms and ultimate prognosis depend essentially on the degree of acidosis. In these severe cases the alkali reserve is always below 20 vols. per cent and frequently about 10 vols. per cent. The most effective treatment has been intravenous injection of a 5 per cent solution of sodium bicarbonate. As an alternative, treatment with ethyl alcohol is a valuable method of controlling acidosis.

Details are now available of the research on the prevention and treatment of motion sickness as a preliminary to the invasion of France. The final result was the Canadian Motion Sickness Remedy containing Hyoscine hydrobrom, Hyoscyamine hydrobrom and V 12.

Prickly heat and tropical anhidrosis receive a detailed study in this year's review. Meticulous histological observations are described about this annoying malady. The reviewer thinks the whole matter of the mechanism of prickly heat is still subjudice and thanks the workers for bringing out prickly heat from backwaters in which it remained for several years into full stream of investigative interest.

Diagnosis of the sex of the unborn child is still bringing papers of painstaking and methodical study. The reviewer discusses two papers. One paper from Cairo puts forward the view that the urine of a woman pregnant with a boy has different effect on the growth of grain to that of the urine of a woman pregnant with a girl. The second paper discusses the effect on the size of testes of a rabbit when urine of a woman in the last 2 months of pregnancy is injected in it.

The medical annual has upheld its reputation as one of the best reviewers of the medical literature.

B. P. NEOGY.

CURRENT MEDICAL LITERATURE

Chloromycetin

A new strain of Streptomyces, named Chloromycetin, was isolated from a soil sample collected in a mulched field near Caracas, Venezuela, by Burkholder of Yale University. Cultures of this organism were found to inhibit adjacent inoculums of a wide variety of gram-positive and gram-negative micro-organisms. The crystalline form inhibits bacteria when tested in dilutions as high as 0·35 microgram per cubic centimeter, a higher effective dilution than that of the earlier antibiotics. More detailed studies of the therapeutic effects of chloromycetin were undertaken by Smadel and Jackson (Science, **106**:418, 1947).

Seven-day embryonated eggs infected with several rickettsial organisms were treated with chloromycetin. Doses as large as 1 mg. per egg would reduce the mortality by at least 65 per cent. Sixteen of 24 treated eggs survived to the 15th day after infection and eight hatched normally. Similar therapeutic effects were noted in mice infected with scrub typhus. Daily intraperitoneal injections of as little as 0·1 mg. doses reduced the mortality to zero. By doubling the dosage chloromycetin was equally effective if given orally.

Smadel and his associates suggest that chloromycetin might be of value in human medicine on account of its apparently low toxicity, ready absorption of chloromycetin from the alimentary tract and its beneficial effects when given relatively late in experimental disease. As a preliminary to a proposed study of its therapeutic value, Smadel and his associates administered single or repeated oral doses to a group of physician volunteers. After a single dose of 2 gm. appreciable amounts of the drug were demonstrable within 30 minutes in both blood and urine. The titers decreased to zero by the end of eight hours.

From this rapid elimination of the drug frequent oral administration is indicated in order to maintain the antibiotic at an appreciable level in the blood stream. With a 1 gm. initial dose followed by 0·2 gm. doses every four hours, the antibiotic can be maintained at an effective level in the blood. Approximately 10 per cent of the total amount thus given was recovered in active form from the urine. Toxic effects were not observed by the volunteer physicians during or after such administration. After this preliminary work on normal volunteers a group of five patients with typhus were treated with the same oral doses. (Smadel and Pus—*Proc. Soc. Exper. Biol. & Med.*, **68**:12, 1948). In all cases there was a rapid fall in pulse rate and body temperature. The delirium and rash disappeared within three to five days and toxic reactions were not noted. Comparison was made with an equal number of patients with typhus not treated with the new antiobiotic.

On the basis of these limited comparisons Smadel and his associates concluded that the administration of chloromycetin to patients with typhus is a safe procedure and that the therapeutic effects are sufficiently encouraging to warrant further tests of the drug with rickettsial and virus diseases More extensive tests of this drug were made by the Malaya Institute of Medical Research, during the recent outbreak of scrub typhus at Kuala Lumper. (Smadel & others—*Science*, **108**:60, 1948). Twenty-five hospitalized patients were treated with chloromycetin, while 12 untreated hospitalized patients served as controls.

Treatment was begun on an average 6·2 days after the onset of the infection. All treated patients became afebrile within an average of 30 hours after the initial dose. The untreated patients remained febrile for an average of 18 days. Rickettsemia disappeared within 24 hours after the initial dose, and the rash within 48 hours. All treated patients on an average of 13 days after beginning the treatment. The untreated controls remained on an agerage for 30·7 days after onset. No complications or deaths were noted with the 25 treated patiennts. Among the 12 untreated controls, in two complications developed (parotitis, pneumonia), and one died. —*U. S. News Letter.*

Aureomycin

Penicillin and streptomycin, effective as they are in many infections, still leave gaps in the antibacterial spectrum; so the search for new antibiotics goes on. A new one, described by B. M. Duggar of Lederle Laboratories, is aureomycin, derived from a strain of *Streptomycin aureofaciens* and effective against numerous gram-positive and gram-negative organisms, including streptococci of Lancefield groups A, D, F and G, *Strep. faecalis, Bact. pneumoniae, Strep. pneumoniae* types i, ii and iii, *Haemophilus influence*, and *Brucella suis* and *abortus*. The antibiotic has been obtained as a yellow crystalline hydrochloride which deteriorates rapidly in alkaline solution at room temperature. The "acute toxicity" of aureomycin when injected subcutaneously into mice is between 3000 and 4000 mg. per kg.; daily doses of 60 mg. per kg. by mouth and of 3 mg. per kg. parenterally are well tolerated in man. It is excreted in large quantities in the urine but does not penetrate the blood-brain barrier.

Aureomycin is as effective as penicillin in protecting mice against *Strep. pneumoniae* type 1 but is inferior to penicillin against beta-haemolytic streptococcal infections. Clinical trials have been carried out by Prof. Perri H. Long and his colleagues (*J.A.M.A.*, **128**:117, 1948) at Johns Hopkins Hospital, Baltimore. The dosage given by mouth varied from 10 to 60 mg. per kg. of body-weight per day, in divided doses. Intramuscularly a total daily dosage of 3 mg. per kg. given six-hourly, was well tolerated, though there were signs of moderate irritation at the site of injection. Five patients with Rocky Mountain spotted fever seemed to respond to aureomycin in twelve to seventy-two hours, and a patient with chronic brucellosis had a negative blood-culture forty-eight hours after the start of treatment and remained afebrile and asymptomatic for the next two months. The antibiotic sterilised the urine of two patients with a paracolon infection. These numbers are very small and need extending for critical appraisal. There is no question of aureomycin being another penicillin, but if the claims made for it are confirmed it should prove useful, particularly for the control of brucellosis and urinary-tract infections.—*Brit. M. J.*, Oct. 16, 1948.

Streptomycin Treatment of Pulmonary Tuberculosis

The following gives the summary of the short-term results of a controlled investigation into the effects of stsreptomycin on one type of pulmonary tuberculosis the enquiry being

planned and directed by the Streptomycin in Tuberculosis Trial Committee (a Medical Research Council Investigation).

One hundred and seven patients with acute progressive bilateral pulmonary tuberculosis, unsuitable for collapse therapy, were studied in a clinical trial of streptomycin.

The supply of streptomycin available during the investigation was limited. The type of disease selected was one considered hitherto unsuitable for any form of treatment other than bed-rest. Bed-rest accordingly was the treatment given to one group of 52 patients (C), while 55 patients were treated with bed-rest plus streptomycin (S). Patients were assigned to one or the other group by random selection, and only after acceptance as suitable for the trial.

The period of observation for each patient, under conditions laid down for the trial, was six months.

S patients received 2 g. of streptomycin intramuscularly daily in four injections at sixhourly intervals. No toxic effects necessitated stopping treatment, but vestibular disturbance was common.

At the end of six months 7 per cent of S patients and 27 per cent of C patients had died. Considerable improvement radiologically was noted in 51 per cent of S cases and 8 per cent of C cases. Slight or moderate improvement was noted in 18 per cent of S cases and 25 per cent of C cases. Apart from those who died, deterioration was seen in 18 per cent of S cases and 34 per cent of C cases.

The main difference between S and C series is among the patients clinically acutely ill on admission: thus, among patients having on admission evening temperatures of 101°F. (38·3°C) or over, 13 of 24 S patients and two of 19 C patients showed improvement radiologically.

More S patients than C patients showed clinical improvement, but the difference between the two series is smaller than in respect of radiological changes.

Improvement in S cases was greatest in the first three months. After the end of this period many S cases began to deteriorate.

At the end of six months examinations for tubercle bacilli were negative in eight S cases and two C cases. The best result in S cases were seen in the first months of treatment.

Results of tests for streptomycin sensitivity of infecting strains are given for 41 cases. In 35 cases tests revealed *in vitro* resistance from 32 to over 8,000 times that of the original strain or the standard H37Rv. In most cases streptomycin resistance emerged in the second month of treatment. It seems probable that streptomycin resistance is responsible for muuch of the deterioration seen in S cases after first improvement.—(*Brit. M. J.*, **2**:769, 1948).

Treatment of Diabetic Coma

Joslin (*Brit. M. J.*, **2**:657, 1948) in a letter to the Journal gives the summary of the scheme of treatment of diabetic coma adopted in his clinic:

First Hour after Admission—Assign a special nurse, experienced in coma treatment, for the first few hours.

Laboratory:

1. *Urine*—Examine for sugar, diacetic acid, albumin, casts and pyuria. Catheterize if necessary.

2. *Blood*—Test for sugar and Co_2 content, with emergency report inside the hour. White blood count and non-protein nitrogen also of value.

3. *Search for Complications*—A. History to explain cause of coma. B. Physical examination, noting particularly—(*a*) State of consciousness, type of respiration, pulse rate, blood pressure, and rectal temperature. (*b*) Look for soft eyeballs, dry tongue, dilated stomach, cold and mottled skin, and impacted rectum.

4. *Insulin*—100 units of crystalline insulin subcutaneously at once for adults, if blood sugar exceeds 300 mg. per 100 c.c. and if the blood CO_2 content is 9 millimols per liter (20 volumes per cent) or less. The dose would be proportionately less in cases of recent onset of diabetes or in young children. In cases with blood sugar between 600 and 1000 mg. give 200 units additional, and with blood sugar over 1000 mg. give 300 units additional. In patients in circulatory collapse, give preliminary additional doses of insulin intravenously.

5. *Gastric Lavage*—Use large tube, aspirate completely and wash stomach with warm water with greatest care.

6. Normal saline intravenously, 2000 c.c. and repeat if indicated by dehydration and blood pressure below 90 mm. Hg. Avoid too rapid administration, especially in older patients.

7. Keep patient warm yet avoid burns, as from hot water bottle.

Second to Sixth Hour—Occasionally the gravity of the case necessitates repetition of first hour's total insulin in the second hour.

8. Repeat blood sugar and CO_2 determinations after three hours. For rising blood sugar give insulin 50-200 units, according to physician's judgment of prognosis.

9. *Fluids by mouth* (as soon as tolerated), 100-120 c.c. per hour of broth, ginger ale, orange juice, tea or coffee, to be sipped by patient or spooned by nurse. If nausea and vomiting recur, withhold fluids orally for 12 hours (lavage stomach again if indivated) and then resume.

10. Soft or liquid food such as oatmeal gruel, orange juice or milk diluted half and half with lime water, not to exceed 10 gm. carbohydrate per hour.

11. *Enema* for cleansing and to relieve abdominal distension.

12. Record blood pressure, pulse and temperature; note signs of improvement, or the reverse.

13. Urine analysis for sugar and diaceic acid every hour. Record volumes.

Sixth to Twenty-fourth Hour—14. Repeat blood sugar and CO_2 determinations and give insulin 50-200 units if blood sugar and CO_2 levels are not improving.

Insulin (crystalline) may now be given according to urine tests every 1 to 4 hours if fall in blood sugar has been satisfactory.

If test is—	Red	Orange	Yellow	Green	Blue
Give—	20	16	12	0	0

units.

15. *Urinary output*—Observe this closely and note with alarm any sign of anuria. Treat with 1500 c.c. intravenous saline if shock is persisting. Repeat as necessary. For anuria, associated with hypochloremia, give 50 c.c. of 10 per cent salt solution intravenously. Never give hypertonic glucose solu-

tion to promote diuresis. Beware producing excessive diuresis with consequent loss of base, especially of potassium.

SECOND DAY—Soft Food—Diet: Carbohydrate 100 to 150 gms., protein 50 gms., fat 50 gms.

17. Protamine zinc insulin should be begun, supplemented by crystalline insulin in small to moderate doses before meals, as indicated by blood sugar and urine tests.

THIRD DAY—Patient should gradually return to the standard diabetic diet for age and weight with carbohydrate 150 to 200 gms., protein 60 to 100 gms. and fat 60 to 120 gms. daily.

Possibly this summary may be of interest because it provides against excess of treatment or the reverse. Constructive criticisms of this summary will be welcome. We recently had 92 cases of diabetic coma in succession without a death.

TREATMENT OF THYROTOXICOSIS

ROBERTSON (*Lancet*, **2**:675, 1948) writes that of 350 patients with thyrotoxicosis 111 were treated with thiouracil: of those aged under 21 years 10 out of 16 (62 per cent) were improved; of those aged 21-45 years 29 out of 73 (40 per cent) were improved; and of those aged over 45 years (all with nodular goitre) 11 out of 22 (50 per cent) were improved.

Contra-indications to the use of thiouracil are signs of pressure on the airway, toxic nodular goitre, a retrolaryngeal upper pole of the thyroid gland, pronounced exophthalmos, predominance of heart symptoms, depression due to thyrotoxicosis, and the absence of facilities for blood-counts, etc.

Indications for the use of thiouracil are the youth of the patient, predominance of nervous symptoms other that depression, elderly patients who are grave surgical risks, recurrent thyrotoxicosis after operation, and severe thyrotoxicosis requiring preparation for operation.

Over 250 patients with thyrotoxicosis, including nearly all those who did not respond sufficiently to thiouracil, were operated on: of those aged under 21 years 14 out of 16 did well; of those aged 21-45 years all did well; and of those aged over 45 years all did well except one who died (the only death in the series).

ASCORBIC ACID IN THE TREATMENT OF HAEMORRHAGE IN PEPTIC ULCER

While the majority of patients with serious hæmorrhage from peptic ulcer pass through the ordeal and recover, irrespective of the type of medical treatment employed, a sufficient percentage die from hæmorrhage to put us on guard and rob us of that sense of security which most clinicians formerly felt. Arguments still continue as to whether to starve or feed the bleeding ulcer patient, but the majority of American physicians believe in withholding food and give only cracked ice, while the patient is rendered quiet with an ice cap on the epigastrium.

Blood transfusions may be employed if thought advisable or imperative. While surgical intervention is usually undesirable because of technical difficulties in locating the bleeding vessel and because of the patient's poor condition as a surgical risk, it must nevertheless be undertaken if all other measures give promise of failing.

When presented with the emergency of a patient bleeding uncontrollably in spite of repeated blood transfusions, the possible role of a deficiency in ascorbic acid ought to be considered. The writer has recently seen two such cases in which the intravenous administration of 100 mgm. of ascorbic acid every two hours has caused a cessation of hæmorrhage and led to recovery. Both cases prior to the use of ascorbic acid were moribund. It is assumed that a vitamin C deficiency had resulted from the use of a restricted diet over long periods of time.

As a corollary, it should be again emphasized, as it has been often emphasized by many authors, that the diet of the ulcer patient ought to be fortified with ascorbic acid, if for no other reason than the favourite influence of this vitamin in case of hæmorrhage.—Editrial, *Am. J. Digest. Dis.*, **15**:354, 1948.

TREATMENT OF PEPTIC ULCER WITH ENTEROGASTRONE

POLLARD and OTHERS (*Arch. Surg.*, **56**:372, 1948) say that the purpose of their study was to reinvestigate the purported effectiveness of enterogastrone in preventing the recurrence of peptic ulcer in man and, if recurrence were prevented, to investigate any measurable change in secretory or motor activities of the stomach that would aid in explaining the mechanism of protection. In addition because previous clinical studies have reported results only with the parenteral use of enterogastrone it was considered desirable to compare the effects of the oral administration with that of parentral administration. In order to accomplish these ends 28 patients with peptic ulcer were carefully studied before and during therapy with enterogastrone.

Twelve patients with peptic ulcer were given enterogastrone orally in doses of 8 to 16 gm. daily for periods up to 11 months. Recurrence of typical symptoms of ulcer occurred in two of these patients while they were under treatment.

Sixteen patients with peptic ulcer were given intramuscular injections of 200 mg. of enterogastrone daily for periods up to nine months. Three of the patients had either recurrence or persistence of symptoms while they were under treatment.

For 17 of the 28 patients treated roentgenograms of the upper gastrointestinal tract were available from the start of therapy. The roentgenologic appearance of the lesion after therapy was improved in six cases, unchanged in eight cases and definitely worse in three cases.

Single intramuscular injections of 200 and 900 mg. of enterogastrone in persons with peptic ulcer produced no changes in the volume of fasting gastric secretion, output of hydrochloric acid, pepsin concentration or gastric motility.

Daily administration of enterogastrone orally or parenterally for periods up to 11 months to persons with peptic ulcer caused no significant alterations in the volume of fasting gastric secretion, volume of hydrochloric acid, pepsin concentration or type of response to a caffeine test meal. This was true whether there was evidence that the peptic ulcer improved, remained stationary or became worse.—*U. S. News Letter.*

Coronary Failure

Freedberg and others (*J.A.M.A.*, **138**:107, 1948) give in the following lines the summary of their observations:

The clinical and pathologic characteristics of the syndrome of acute coronary failure, intermediate between angina pectoris and myocardial infarction, are delineated. Seventeen cases have been presented; 4 are discussed in detail; the rest are summarized. Analysis of the group as a whole shows a continuous gradation in severity of coronary failure between the limits of angina pectoris and acute myocardial infarction.

Characteristic episodes of coronary failure consist clinically of prolonged cardiac pain more intense than angina pectoris, unresponsive to glyceryl trinitrate and rest and without objective evidences of myocardial necrosis; sustained or progressive fever, leukocytosis, elevated sedimentation rate and electrocardiographic patterns of infarction are absent. Presumably, the underlying physiopathologic mechanism of these attacks of pain is prolonged but reversible myocardial ischæmia. Correspondingly, on pathologic examination, no resultant myocardial infarction or extensive fibrosis can be found.

Coronary failure is precipitated in many instances by a specific clinically obvious factor which causes either sudden increase in cardiac work or diminished coronary blood flow; on the other hand, the attack often occurs at rest or during sleep. It seems likely that in some of these latter episodes without evident clinical precipitating factor the sudden relative diminution in coronary blood flow is due to acute narrowing or occlusion in the coronary tree.

The therapeutic management of episodes of this intermediate syndrome of acute coronary failure depends on clinical recognition and proper evaluation of the underlying physiologic and pathologic changes. The treatment of patients with coronary failure differs from that of angina pectoris and of acute myocardial infarction. They must not be advised, as in angina pectoris, to continue or reduce only slightly their usual activities, nor, on the other hand, should they be confined to bed for long periods of time as in acute myocardial infarction. Patients with prolonged cardiac pain should be observed closely for several days in order to determine whether they exhibit the clinical characteristics of coronary failure; if so, they may be permitted to assume gradually increasing activity sitting up in a chair after several days and then becoming ambulatory.

Lipotropic Therapy in Fatty Metamorphosis of Liver

Franklin and others (*Am. J. Path.*, **18**:273, 1948, *Ref. J.A.M.A.*, **138**:96, 1948) write that the 15 patients selected for this study had enlarged livers with moderate to severe fatty infiltration as proved by initial needle biopsy. Group I consisted of 5 persons without cirrhosis, the severe fatty changes in the liver being presumably due to disturbed nutrition. Group II consisted of 10 patients with fatty cirrhosis. Most of these presented some of the usual signs and symptoms of cirrhosis such as ascites, jaundice, splenomegaly, spider nevi and gastro-intestinal disturbance, as well as laboratory findings of impaired hepatic function. Different types of lipotropic therapy were employed namely, cystine plus choline, methionine and diet high in protein and in vitamin B complex. Clinical improvement, as evidenced by subjective and objective findings, was noted in almost all patients after "lipotropic" therapy. Functional improvement was evident by all tests performed except the thymol turbidity and total cholesterol tests, results of which remained abnormal. Disappearance of fat and regeneration of parenchymal cells were noted in all instances. Observations on these patients support the efficacy of lipotropic therapy in the removal of fat from human fatty cirrhotic and non-cirrhotic livers. This was found associated with clinical and functional improvement. No evidence was found that with the removal of fat the cirrhotic process is arrested.

Streptomycin in Intestinal Tuberculosis

Maikoff (*Schweiz. Med. Wchnsch.*, **78**:329, 1948, *Ref. J.A.M.A.*, **138**:246, 1948) presents a preliminary report on the supporting effect of streptomycin in the treattment of ulcerative intestinal tuberculosis. Streptomycin is administered parenterally, but also enterally in the form of high enemas with elevation of the pelvis and subsequent placing on the right side. In this way, the streptomycin can be carried to the ileocecal valve and beyond into the distal portions of the small intestine. The region of the ileocecal valve is the most frequent localization of the ulcerous and tumor-like forms of intestinal tuberculosis. The enema is given daily for two weeks. This enteral local treatment of intestinal tuberculosis with streptomycin has proved to be a valuable supportive treatment in the 5 cases in which it was employed. Only six months have elapsed since the authors tried this treatment. Their observations are similar to those in the United States. The intestinal symptoms were greatly improved. Roentgenoscopy suggests a healing of the ulcers, but complete regression of the tuberculous process has not been observed as yet. If the more distal portion of the colon and the return are involved, treatment by enema is likewise advisable. If tuberculosis involves the small intestine, particularly the proximal portions, oral therapy with streptomycin could be tried with the same doses as those used for bacillary dysentery.

Splanchnic Resection in Malignant Hypertension

Peet and Isberg (*Ann. Int. Med.*, **28**:755, 1948) stress that once the diagnosis of malignant hypertension has been made arrangements should be made for treatment by splanchnic resection, because timely surgical treatment offers sure hope to the victim of this terrible malady. During the time from November, 1933 to December, 1941 a total of 162 cases were diagnosed as malignant hypertension and were surgically treated. Follow-up information was inadequate in 19 cases. This is a study of 143 patients followed for five to twelve years after surgical treatment. Diastolic blood pressure level varied between 140 and 190 mm. Headache, visual disturbance and dyspnœa were the most common complaints. Ninety-one per cent of the patients had organic heart disease; 84 per cent had impaired renal function and 20 per cent had experienced cerebrovascular accidents. The operative mortality in malignant hypertension was 10 per cent. The five year survival rate in the 143 cases was 21·6 per cent. All living patients receiving a funduscopic examination five years and more after operation showed no evidence of papilledema. Four patients were maintaining blood pressure levels within normal range five to eleven years aftter operation. If splanchnic resection can be performed early, before heart disease has occurred, the outlook is good, for 11 of 13 such patients with malignant hypertension were living five to twelve years after operation. Once renal function becomes moderately or markedly impaired, splanchnic resection is futile.

Haemophilia: Medical Management

Wright & others (*J. Lab. & Clin. Med.*, **33**:708, 1948) in reviewing the therapeutic management of 43 patients with hæmophilia over the past seventeen years in the departments of medicine and surgery of Ohio State University differentiate three distinct periods::The first was characterised by the use of nonspecific measures most of which aimed toward increasing the available circulating thromboplastin. These included snake venom, ovarian hormones, placental extracts and foreign protein sensitization, with horse serum or egg albumin as antigens. In the second, despite the use of these measures the continuing necessity for supportive, replacement blood transfusions during acute hæmophilic bleeding episodes finally led to the recognitnon that, of any measure then advocated, whole fresh blood produced the most effective, even though transitory, reduction in the prolonged coagulation time. That fresh or frozen normal human plasma is just as effective as whole fresh blood was demonstrated shortly thereafter. During the third period, World War II gave great impetus to the chemical partition, isolation and therapeutic study of particular fractions from human and bovine blood plasma. As a by-product of these researches has come a so-called antihæmophilic fraction of human plasma, which is bringing new hope not only for the better clinical management of hæmophilia, but also for the ultimate solution of the problem of the physiology and biochemistry of this disease entity. Studies with the concentrated antihæmophilic fraction of Cohn were initiated by the authors early in 1946, when material for clinical studies was made available. Selected cases from their clinical studies are presented to illustrate (1) the comparative effectiveness of the antihæmophilic fraction I of Cohn versus freshly thawed plasma in promoting clot formation and (2) the possibility of successful medical management of the hæmophilic patient during both elective and emergency surgical treatment.

Streptomycin in Bubonic Plague

Haddad and Valero (*Brit. M. J.*, **1**:1026, 1948) say that in 1947 bubonic plague broke out in Haifa, Palestine and sulphonamide drugs, especially sulphadiazine, were administered as a routine in all cases. When possible the initial dose was 2 gm. given orally, followed by 1 gm. every four hours during the acute stage. Latter, smaller quantities were given until the bubo healed. Results were favourable on the whole, but the condition of 3 patients admitted when seriously ill deteriorated rapidly. They were given 200 or 300 mgm. of streptomycin every three hours, and in 1 case it was continued for eleven days. The 3 patients recovered after this treatment, but although the effect of streptomycin on the general condition of the patients was remarkedly good, the buboes appeared to be uninfluenced when treataed late in the disease. This was true also of the sulphonamide drugs. In most cases incision and drainage were necessary to bring about resolution.

Abdominal Distension and DFP

Di-isoprpyl fluorophosphonate or DFP, which was prepared in the course of research on chemical warfare, is the most active of the group of substances first shown by Adrian, Feldberg, and Kilby (*Brit. J. Pharmacol.*, **2**:56, 1947) to inhibit the action of cholinesterase. Its properties are very similar to those of physostigmine. Thus the movements of the gut, now known to be maintained by the liberation of acetylcholine in the wall the gut, are greatly increased by DFP because it prevents the destruction of acetylcholine. It has been used successfully in the treatment of abdominal distension. Grob, Lilienthal, and Harvey (*Bull. Johns Hopkins Hosp.*, **81**:245, 1947) first observed that the daily adminiistration of DFP to 60 normal subjects caused abdominal cramps and diarrhoea, and they, therefore, investigated its action in three volunteers by recording the pressure changes inside a Miller-Abbott balloon lying in the intestine. The intramuscular injection of 2 mg. of DFP in 0·1 per cent solution in arachis oil increased the motility of both small and large intestine about one hour after the injection. Rhythmic contractions of greatly increased amplitude occurred every two to three minutes over a period of two to five hours. The increased intestinal motility caused by DFP was inhibited by giving morphine or pethidine or atropine. This observation is important because of the practice of some surgeons in this country of treating paralytic ileus with morphine. The authors also found that when DFP was being given the intestine became more sensitive to the action of pituitary (posterior lobe) extract and to the action of neostigmine ("prostigmin"). This increased sensitivity persisted for one to three weeks after the last dose of DFP.

Harvey and his colleagues then tested the action of DFP on 64 patients with moderate or severe paralytic ileus; 46 of these had distension following major abdominal operations; eight had peritonitis; five had severe pneumonia; and five had lesions of the spinal cord. Enemas and the use of a rectal tube had been ineffective. In the less severe cases relief was obtained after the intramuscular injection of DFP alone. An initial dose of 2 mg. was followed by further doses at intervals of eight to twenty-four hours. In some of the more severe cases DFP did not fully relieve the distension, but the additional injtction of nesstigmine (0·5-1·0 mg.) proved effective| Pituitary (posterior lobe) extract was given in addition to neostigmine in a few cases. The authors state that they had no failures in this series. It is to be hoped that DFP will soon be available for use in this country.—*Brit. M. P.*, **2**:719, 1948.

Infectious Hepatitis in Pregnancy

Zondek and Bromberg (*J.A.M.A.*, **138**:839, 1948) of Jerusalem made a study of infectious hepatitis in pregnancy during an epidemic of this disease which occurred in Palestine in the course of World War II.

Surprisingly few data have been reported during recent years when this disease complicated pregnancy. There is a tendency among obstetricians to consider infectious hepatitis in its sporadic form (hitherto known as catarrhal jaundice) as an essentially benign disease never leading to serious complications. Jaundice complicating pregnancy which leads rapidly to acute necrosis of the liver is generally considered as a particularly severe form of toxemia of pregnancy. In such cases the infective cause seems often to be overlooked, leading to misinterpretations in the diagnosis and prognosis. The clinical data reported in this study point out the fact that the benign icterus catarrhalis and the extremely serious form of hepatitis with acute liver atrophy in pregnancy should

be considered as the same diseases, both caused by the icterogenic virus of infectious hepatitis.

Twenty-nine patients suffering from infectious hepatitis were observed among 3,382 pregnant women over a period of thirty-two months. Of particular interest is the fact that non-pregnant women affected by hepatitis and considered as sources of contamination in many of the cases described had a mild form of hepatitis; on the other hand, some pregnant women who contracted the disease from them died of acute necrosis of the liver after a particularly severe clinical course.

It has been shown that infectious hepatitis may assume in pregnant women three different clinical course: (1) hepatitis without jaundice (2 patients) with no clinically apparent jaundice, transitory bilirubinurea and only slight impairment of hepatic function; (2) moderately severe hepatitis (18 cases) which differs from the usual form of the disease by insidious onset with the symptoms of the preicteric stage often misinterpreted as due to pregnancy, rare occurrence of itching and bradycardia and serious functional impairment of the liver; (3) severe hepatitis with a tendency to acute necrosis of the liver (9 cases). Five of the 9 patients died from acute atrophy of the liver. The severity of the disease is indicated by pronounced mental instability, tachycardia, excessive vomiting, subsidence of pain in the liver area and reduction of the liver size; the laboratory examinations show progressive decrease of the urea blood levels, rapidly dcereasing total chloesterol and ester blood values, hypoglycemia and inadequate estrone inactivation.

In the study of factors contributing to the severity of infectious hepatitis in pregnant women, pregnancy must be considered a decisive factor aggravating the course of the disease. Moreover, undernutrition due to insufficient dietary intake or to excessive vomiting seems to play a particularly important role as an additional aggravating factor. In none of these cases studied was the fetus in utero contaminated by the disease of the mother; the virus of infectious hepatitis does not seem to be able to infect the fetus because either it does not pass the chorionic barrier or it circulates in insufficient amount in the blood to induce infection.

The treatment in cases of severe disease consisted in intravenous administration of essential nutritional factors (carbohydrates, proteins, essential amino acids and vitamins) in high doses. Blood transfusions were frequently administered. Despite treatment, 5 patients died from acute atrophy of the liver. It should be emphasized that although this mortality rate is high, 4 patients with symptoms of extremely grave prognostic omen (such as comatose condition, fetor hepaticus, reduction of liver size and laboratory findings of severe liver damage) could be saved.

The outstanding problem in the obstetric treatment of infectious hepatitis in pregnancy is whether artificial interruption of pregnancy should be performed. The results of this study seem to demonstrate that an active attitude is not advisable. The artificial termination of pregnancy made at the onset of the disease might sacrifice the fetus in a case in which the disease may have had a benign clinical course and greatly aggravate the hepatitis by the trauma which it involved.

Ovarian Disturbances after Thiouracil

Kopi and others (*Klin. Wochen.*, **26**:202, 1948, Ref. *J.A.M.A.*, **138**:852, 1948) found in experiments on rats that thiouracil and methylthiouracil cause changes in the maturation of the ovum which become manifest in the form of irregularities in the œstrual cycle; œstrus becomes less frequent. These experiments on animals are corroborated by observations on human subjects. Here, too, changes in the menstrual cycle develop under the influence of antithyroid substances. Menstruation has been known to become less frequent during treatment with methylthiouracil; cases have also been observed in which existing menstrual disturbances become regulated. This becomes understandable when it is recalled that transitions exist between stimulating and injurious effects of thyroid substances on the ovary. Menstrual anomalies seem to be elicited not by a definite thyroid disturbance but by the manner and degree of the changes produced in the ovary under the influence of the thyroid hormone. The authors believe that the changes in ovarian function which follow medication with the thiouracils are the result of the simultaneous existence of insufficiency and hyperfunction of the thyroid.

Brain Tumors in Children

French (*Minnesota Med.*, **31**:867, 1948) writes that there are certain fairly constant symptoms that occur in children with brain tumors which lead one to suspect this diagnosis. There are other symptoms which not only indicate the presence of an intracranial tumor but assist in localization.

General Symptomatology—A change in the patient's personality was the earliest symptom in 20 per cent of the 146 children in this series, and occurred some time during the course of the disease in 40 per cent. of them. The frequency of this change was no greater in the children with supratentorial than in those with subtentorial tumors.

Symptoms caused by a generalized increased intracranial pressure were usually the next indication of the existence of a brain tumor. The headache, which was usually accompanied by vomiting, frequently occurred in the morning after the child had arisen from bed, and was considered to be due to the change in dynamics of the blood pressure and the cerebrospinal fluid pressure. Following the vomiting, the headache was usually relieved. The headaches were occasionally localized over the occipital and posterior cervical region. Anything that increases the intracranial pressure, such as coughing, sneezing or straining, may initiate the headaches, vomiting, and occipital pains.

Increasing circumference of the head, bulging fontanelles, palpable widening of the sutures, and dilated scalp veins were clear but late indications of increased intracranial pressure. Likewise, a decrease in visual acuity was a late symptom.

There was a certain intermittency of all these symptoms especially in the children under eight years of age. This is considered to be due to the intermittent relief of the increased intracranial pressure from the progressive widening of the cranial sutures.

General Signs of Brain Tumors—Examination of the children with brain tumors in this series revealed, early in the course of the illness, only signs of increased intracranial pressure. The most frequent evidence of such pressure was

papilledema. Other evidence of increased pressure was dilatation of the veins over the frontal and occipital regions, widening of the cranial sutures, bulging of the fontanelles, and increased head circumference. Extraocular palsies, especially involvement of the sixth cranial nerve, were occasionally present. Roentgenological evidence of increased intracranial pressure was present in 80 per cent of these patients with intracranial tumors.

The presence of congenital deformities such as multiple cutaneous areas of pigmentation, absence of the roof of the orbit, or asymetrical physical development, when present, should cause one to suspect an associated intracranial tumor.

Localizing Symptoms—Symptoms that are not primarily due to increased intracranial pressure are ataxia, paresis of the extremities, convulsive seizures, polyuria and polydipsia, and abnormal body development.

Localising Signs—Signs that are of localizing value are cranial nerve palses, visual field defects, inco-ordination of the extremities, reflex changes, nystagness, restricted upward gaze and stiff neck.

Brain tumors in children are not uncommonly associated with congenital developmental defects, such as multiple neurofibromatosis and telangiectases.

Roentgenography—Roentgenography of the skull is a routine procedure in the investigation for an intracranial neoplasm.

Roentgenograms taken in the lateral, posteroanterior, and occipital positions were routine. Stereoscopic views were obtained whenever it was thought that they would provide additional information. Ventriculograms were performed whenever the existence or localization of a brain tumor was in doubt.

Increased Intracranial Pressure. Three abnormalities frequently observed in patients with increased intracranial pressure are: (1) widening of the cranial sutures, (2) increased convolutional (digital) marking, and (3) erosion of the sella.

Local erosion of that portion of the calvarium immediately overlying the tumor was also encountered in this series of patients.

Pineal Shift. In 1925 Naffziger reported that a shift in the position of the pineal gland may be of great value in localizing brain tumors. However, the pineal gland is seldom calcified until late in childhood and so this method is of less value in children than in older individuals.

The presence of intracerebral calcification in a patient suspected of having a brain tumor is not only excellent evidence that such a lesion is present, but also the calcium indicates accurately the site of the lesion.

Some assistance in differential diagnosis can also be obtained from the appearance and the location of the calcification. Suprasellar calcification that seemed to outline a cystic cavity was either a craniopharyngioma or a cholesteatoma. Stippled areas of calcification in the occipital or temporal regions were most likely to be oligodendroglioma, ependymoma, or astrocytoma. Calcification that appeared to outline the cerebral convolutions indicated the presence of an angioma.

Ventriculography—Ventriculograms were performed in thirty-eight of the 123 patients and were of value in localizing the lesion in twenty-nine of them.

Ventriculography was not only of value in determining the presence and localization of the lesion but also was of assistance in judging the operability of the tumor.

Hypofunction of Adrenals during Early Life

Jaudon (*J.A.M.A.*, **132**:641, 1948) emphasizes that the pediatrician should acquaint himself with the life-sustaining functions of the adrenal glands and should think of the possibility of temporary hypofunction of these glands when dealing with infants who present symptoms of protracted gastrointestinal disturbances, who fail to gain weight, who have an unexplained tendency to dehydration and who respond unsatisfactorily to the accepted therapeutic measures. The author presents 5 cases which demonstrates the existence of a fractional and transitory disturbance in adrenal function. The patients required administration of desoxycorticosterone acetate and salt for long periods to sustain life. Low carbon dioxide-combining power, elevated non-protein nitrogen, and moderately low serum sodium chloride during periods of hemoconcentration were present in all cases. The clinical course before, during and after hormone therapy is evidence suggesting a temporary absence of physiologic low supply of the desoxycorticosterone factor of the adrenal cortex.

Oral BCG Vaccination of Newborn Infants

Dr. Arlindo de Assis has published a report on the work of the Ataulpho de Paiva Tuberculosis Foundation during 1947, when 20,516 newborn infants were vaccinated on the fourth to the tenth day of life with a single dose of 100 mg. of BCG by mouth. The immunization by this method was as well tolerated as the former system of giving three doses of 30 mg. on alternate days to every infant. From the point of view of mass vaccination of new-born infants the single dose method is clearly more advantageous than the former one. The BCG vaccine used was prepared with 14 day old pellicle growths and the fluid employed was the Sauton diluted to one-fourth strength and carefully adjusted to pH 7·2. The concentration of BCG in the vaccine was 20 mg. cubic centimeter the vaccine having been stored at 4 C. for no longer than ten days after its preparation. To determine the first appearance of tuberculin reactivity of vaccinated children living in non-tuberculous households, a sample of 2,028 infants was tested intradermally with 1 mg. and 10 mg. of old tuberculin. Reactions were considered positive only if the indurations reached more than 4 mm. in diameter after forty-eight hours. About 60 per cent. of reactors were observed between the fourth and the sixth week of life of the vaccinated. The Negro infants were more particularly able to become tuberculin positive than the White. Starting from the seventh week of life an increasingly larger porportion of reactors was found. Dr. Assis expressed the belief that the single dose method of immunizing new-born infants may represent a decided step toward a final extensive programme of tuberculosis prevention.—*J.A.M.A.*, **138**:89, 1948.